Volume 20
Number 1
Spring 2022

ISSN 1854-6935

Managing Global Transitions International Research Journal

EDITOR IN CHIEF
Jana Hojnik

Managing Global Transitions
International Research Journal
ISSN 1854-6935 · www.mgt.fm-kp.si

Managing Global Transitions
International Research Journal
VOLUME 20 · NUMBER 1 · SPRING 2022 · ISSN 1854-6935

https://doi.org/10.26493/1854-6935.20_1

INDEXING AND ABSTRACTING

Managing Global Transitions is indexed/ listed in the International Bibliography of the Social Sciences, EconLit, IBZ Online, DOAJ, Erih Plus, EconPapers, Cabell's, EBSCO, and ProQuest.

AIMS AND SCOPE

Managing Global Transitions (MGT) is a quarterly, scholarly journal that covers diverse aspects of transitions and welcomes research on change and innovation in increasingly digitalized and networked economic environments, from a societal, organizational, and technological perspective. MGT fosters the exchange of ideas, experience, and knowledge among developed and developing countries with different cultural, organizational, and technological traditions. MGT invites original scientific, research, and review papers advancing the field of transitions in societies, organizations, and technologies.

TOPICS COVERED

Transitions in Societies

- Geo-political transitions, transition experiments, pathways and mechanisms
- Social, demographic, cross-cultural, ethical, geo-political and security aspects of transitions
- Social change, prosperity, wellbeing, happiness
- Policy making, government regulation, social responsibility
- Knowledge-based society and world futures
- New and emerging metrics for measuring, assessing and evaluating societal transitions

Transitions in Organizations

- Organizational analysis and design, modeling, developments and changes in organizational learning and behavior
- International strategy and strategic alliances, networked businesses and operations
- Entrepreneurship and leadership, decision making
- Knowledge sourcing and innovation management, personal development, education and training, HRM
- Business systems and business models
- Connective intelligence and collective intelligence in organizational behavior

Transitions in Technologies

- Managing technological/organizational change and innovation
- Technology networks, technology transfer benefits and risks, technology acquisition and diffusion
- Smart technologies and development discontinuities and sustainability
- Digitalization, IOT, ICT, cybernetics, forecasting
- Technological traditions, strategic surprise and response systems
- Studies that promote understanding of the dynamics of socio-technical systems change
- Science and technology policy that fosters transformative advancement
- Modeling technological change in VUCA (volatile, uncertain, complex, ambiguous) environments

EDITORIAL OFFICE

University of Primorska, Faculty of Management
Izolska vrata 2, 6000 Koper, Slovenia
mgt@fm-kp.si · www.mgt.fm-kp.si

PUBLISHED BY

University of Primorska Press
Titov trg 4, 6000 Koper, Slovenia
zalozba@upr.si · www.hippocampus.si

Revija Managing Global Transitions je namenjena mednarodni znanstveni javnosti, izhaja v angleščini.

Are Firing Costs Important for Business Cycles? Lessons from Bulgaria (1999–2018)

Aleksandar Vasilev
Lincoln International Business School, UK
avasilev@lincoln.ac.uk

Received: 1 June 2021 · Accepted: 11 September 2021
Published online: 31 March 2022 © Authors

We introduce firing costs into a real-business-cycle setup augmented with a detailed government sector. We calibrate the model to Bulgarian data for the period following the introduction of the currency board arrangement (1999–2018). We investigate the importance of such labour market frictions for cyclical fluctuations in Bulgaria. Firing costs decrease employment volatility and pro-cyclicality, where both effects come at odds with data. Besides those, we do not find other important effects of firing costs for business cycle fluctuations in Bulgaria.

Key Words: business cycle fluctuations, labour markets, firing costs, Bulgaria
JEL Classification: E24, E32

https://doi.org/10.26493/1854-6935.20.3-17

Introduction and Motivation

As pointed out in Vasilev (2016; 2017a; 2017c), the standard Dynamic Stochastic General Equilibrium (DSGE) setups, equipped with the perfectly-competitive labour markets assumption, e.g. Vasilev (2009), are not able to capture well the dynamics exhibited by the major labour market variables – namely wages, employment and unemployment – in Bulgaria. The shortcoming of the neoclassical framework might be driven by the assumption that hours are being rented for any number of hours at no additional cost for the firm besides the going wage rate. In reality, the employer-employee relationship in Bulgaria is much more complicated than that, especially in the post-recruitment stage. More specifically, a labour contract has a social dimension, and the job security aspect takes the form of a so-called 'permanent contract.' In other words, most labour arrangements are long-term ones, and often done collectively by organizations such as labour unions on the worker's behalf. Vasilev (2019) documents the importance of organised labour for aggregate economic outcomes in Bulgaria.[1] For example, despite the low unionisation rates in Bulgaria (10–15% over the period studied), collective agreements are still

prevalent in many firms. In addition, the labour legislation tends to protect the worker against unlawful contract termination, and there is a substantial severance pay (up to a six-month salary awarded to the worker), plus the worker being reinstated at his/her former position.[2]

The labour market features presented above should motivate researchers who are interested in studying economic issues of relevance to Bulgaria to adapt the benchmark DSGE model, and more specifically, to augment it with a more realistic labour market mechanism, which has to deviate substantially from spot wage contracting. After all, the employer-employee relationship is a multi-period contract problem. Terminating a relationship, especially when done unilaterally by the employer, is costly in terms of time and resources. In addition, the laid-off personnel would then need to be replaced by new hires, i.e. there are so-called 'turnover costs.' Lastly, there are costs associated with recruiting, training, and retaining new workers. Dunne et al. (1989), Lazear (1990), Bentolila and Bertola (1990), and Hopenhayn and Rogerson (1993), among many others, argue that the presence of firing costs is important for the structure of industry, as well as firm dynamics.

In this paper, we take the presence of such labour cost frictions seriously. The novelty relative to earlier studies is that here we will focus on the effect of firing costs on business cycle fluctuations in Bulgaria. We will introduce such costs into the firm problem as a convex function of past employment. Our ad hoc approach is thus going to be utilized as a diagnostic tool, aiming to assess the quantitative importance of labor market imperfections.[3] What is more important, is that the presence of those real rigidities in the labour markets, and the way they are modelled in this paper, introduces persistence in employment, unemployment, and indirectly in output. Such labour market imperfections could be thus regarded as a potentially important propagation mechanism to replicate data behaviour, especially along the labour market dimension.

We proceed to incorporate firing costs in a standard real-business-cycle (RBC) model with a government sector. We think that the analysis of labour markets should be always performed within a general equilibrium setup, as any study utilizing partial equilibrium setups will yield misleading results. We calibrate the model for Bulgaria in the period 1999–2018,[4] and then proceed to quantitatively evaluate the effect of such labour market frictions. To the best of our knowledge, this is the first study on the particular issue using modern macroeconomic modelling techniques, and is thus an important contribution to the studies on Bulgaria.

The rest of the paper is organized as follows: Section 2 describes the model framework and describes the decentralized competitive equilibrium system, Section 3 discusses the calibration procedure, and Section 4 presents the steady-state model solution. Sections 5 proceeds with the out-of-steady-state dynamics of model variables, and compares the simulated second moments of theoretical variables against their empirical counterparts. Section 6 concludes the paper.

Model Description

There is a representative household, which derives utility from consumption and leisure. The time available to the household can be spent in productive use, or enjoyed as leisure. The government taxes consumption spending, and levies a common proportional ('flat') tax on labour and capital income in order to finance purchases of government consumption goods, as well as government transfers. On the production side, there is a representative firm, which hires labour and capital to produce homogeneous final goods, which could be used for consumption, investment, or government purchases.

HOUSEHOLDS

There is a representative household, which maximises its expected utility function

$$\max E_0 \sum_{t=0}^{\infty} \beta^t \Big\{ \ln c_t + \gamma \ln(1 - h_t) \Big\}, \tag{1}$$

where E_0 denotes the household's expectations as of period 0, c_t denotes the household's private consumption in period t, h_t are hours worked in period t, $0 < \beta < 1$ is the discount factor, and $0 < \gamma < 1$ is the relative weight that the household attaches to leisure.

The household starts with an initial stock of physical capital $k_0 > 0$, and has to decide how much to add to it in the form of new investment. The law of motion for physical capital is

$$k_{t+1} = i_t + (1 - \delta)k_t \tag{2}$$

and $0 < \delta < 1$ is the depreciation rate. Next, the real interest rate is r_t, hence the before-tax capital income of the household in period t equals $r_t k_t$. In addition to capital income, the household can generate labour income. Hours supplied to the representative firm are rewarded at the hourly wage rate of w_t, so pre-tax labour income equals $w_t h_t$. Lastly, the

household owns the firm in the economy and has a legal claim on all the firm's profit, π_t. Next, the household's problem can be now simplified to

$$\max E_0 \sum_{t=0}^{\infty} \beta^t \Big\{ \ln c_t + \gamma \ln(1 - h_t) \Big\} \tag{3}$$

$$\text{s.t. } (1 + \tau^c)c_t + k_{t+1} - (1 - \delta)k_t = (1 - \tau^y)[r_t k_t + \pi_t + w_t h_t] + g_t^t \tag{4}$$

where τ^c is the tax on consumption, τ^y is the proportional income tax rate on labour and capital income ($0 < \tau^c, \tau^y < 1$), and g_t^t denotes government transfers. The household takes the tax rates $\{\tau^c, \tau^y\}$, government spending categories (consumption and transfers), $\{g_t^c, g_t^t\}_{t=0}^{\infty}$, profit $\{\pi_t\}_{t=0}^{\infty}$, the realised technology process $\{A_t\}_{t=0}^{\infty}$, and prices $\{w_t, r_t\}_{t=0}^{\infty}$, and chooses $\{c_t, h_t, k_{t+1}\}_{t=0}^{\infty}$ to maximise its utility subject to the budget constraint.[5]

The first-order optimality conditions are as follows:

$$c_t : \frac{1}{c_t} = \lambda_t(1 + \tau^c) \tag{5}$$

$$h_t : \frac{\gamma}{1 - h_t} = \lambda_t(1 - \tau^y)w_t \tag{6}$$

$$k_{t+1} : \lambda_t = \beta E_t \lambda_{t+1} \Big[1 + (1 - \tau^y)r_{t+1} - \delta \Big] \tag{7}$$

$$\text{TVC} : \lim_{t \to \infty} \beta^t \lambda_t k_{t+1} = 0, \tag{8}$$

where λ_t is the Lagrangian multiplier attached to the household's budget constraint in period t. The interpretation of the first-order conditions above is as follows: the first one states that for each household, the marginal utility of consumption equals the marginal utility of wealth, corrected for the consumption tax rate. The second equation states that when choosing labour supply optimally, at the margin, each hour spent by the household working for the firm should balance the benefit from doing so in terms of additional income generated, and the cost measured in terms of lower utility of leisure. The third equation is the so-called 'Euler condition,' which describes how the household chooses to allocate physical capital over time. The last condition is called the 'transversality condition' (TVC): it states that at the end of the optimisation horizon, the value of physical capital should be zero.

FIRM PROBLEM

There is a representative firm in the economy, which produces a homogeneous product. The price of output is normalised to unity. The produc-

tion technology is Cobb-Douglas and uses both physical capital, k_t, and labour hours, h_t, to maximise the present value of profit

$$\Pi = \sum_{t=0}^{\infty} \beta_t \left\{ A_t k_t^{\alpha} h_t^{1-\alpha} - r_t k_t - w_t h_t - \frac{\phi}{2} h_{t-1}^2 \right\}, \tag{9}$$

where $\beta_t = \beta c_{t-1}/c_t$ is the firm's stochastic discount factor, and A_t denotes the level of technology in period t. Note that in addition to the direct payment to labour, the firm also faces some quadratic firing costs, $\frac{\phi}{2} h_{t-1}^2$, where $\phi > 0$ is the scale parameter. The firing costs are introduced as a function of past employment, as firing costs are usually associated with hiring decisions made in the past.[6] In addition, the presence of such convex adjustment costs make the firm problem dynamic. The firm's optimal rental of capital and labour services is determined by the following conditions:

$$k_t : \alpha \frac{y_t}{k_t} = r_t, \tag{10}$$

$$h_t : (1-\alpha) \frac{y_t}{h_t} - \beta \frac{c_t}{c_{t+1}} \phi h_t = w_t. \tag{11}$$

In equilibrium, capital is paid its marginal product. However, the presence of firing costs works like a negative externality in the model, and effectively decreases the return to labour. In this setup labour is an asset: once hired, it generates a return, but there is an inter-temporal trade-off, which says that there might be an additional cost in the case that the labour relation, which initiated yesterday, is terminated today.[7] Such costs decrease the benefit from working. The firm then builds those costs into today's wage offer, lowering the hourly pay rate, and realizes a certain rent. Thus, in equilibrium with fixed costs, labour is paid less than its marginal products, and there are economic profits, or in period terms, $\pi_t > 0, \forall t$.

GOVERNMENT

In the model setup, the government is levying taxes on labour and capital income, as well as private consumption, in order to finance spending on wasteful government purchases, and government transfers. The government budget constraint is as follows:

$$g_t^c + g_t^t = \tau^c c_t + \tau^y [w_t h_t + r_t k_t + \pi_t] \tag{12}$$

The consumption tax rate, the income tax rate and government consumption-to-output ratio would be chosen to match the average share

in data. Finally, government transfers would be determined residually in each period so that the government budget is always balanced.

DYNAMIC COMPETITIVE EQUILIBRIUM (DCE)

For a given process followed by technology $\{A_t\}_{t=0}^{\infty}$, tax schedules $\{\tau^c, \tau^y\}$, lagged employment $\{h_{-1}\}$ and initial capital stock $\{k_0\}$, the decentralized dynamic competitive equilibrium is a list of sequences $\{c_t, i_t, k_t, h_t\}_{t=0}^{\infty}$ for the household, a sequence of government purchases and transfers $\{g_t^c, g_t^t\}_{t=0}^{\infty}$, and input prices $\{w_t, r_t\}_{t=0}^{\infty}$ such that (i) the household maximises its utility function subject to its budget constraint; (ii) the representative firm maximises profit; (iii) the government budget is balanced in each period; and (iv) all markets clear.

Data and Model Calibration

To characterise business cycle fluctuations in Bulgaria, we will focus on the period following the introduction of the currency board arrangement (1999–2018). Quarterly data on output, consumption and investment was collected from the National Statistical Institute (www.nsi.bg), while the real interest rate is taken from the Bulgarian National Bank Statistical Database (www.bnb.bg). The calibration strategy described in this section follows a long-established tradition in modern macroeconomics: first, as in Vasilev (2016), the discount factor, $\beta = 0.982$, is set to match the steady-state capital-to-output ratio in Bulgaria, $k/y = 13.964$, in the steady-state Euler equation. The labour share parameter, $1 - \alpha = 0.571$, is obtained as in Vasilev (2017d), and equals the average value of labour income in aggregate output over the period 1999–2018. This value is slightly higher as compared to other studies on developed economies, due to the over-accumulation of physical capital, which was part of the ideology of the totalitarian regime, which was in place until 1989. Next, the average labour and capital income tax rate was set to $\tau^y = 0.1$. Similarly, the average tax rate on consumption is set to its value over the period, $\tau^c = 0.2$. We calibrate the firing cost parameter ϕ so that in steady state those costs are 5% of GDP.[8]

Next, the relative weight attached to the utility gained from leisure in the household's utility function, γ, is calibrated to match the following condition: that in steady-state, consumers would supply one-third of their time endowment to working. This is in line with the estimates for Bulgaria (Vasilev 2017a) as well over the period studied. Next, the depreciation rate of physical capital in Bulgaria, $\delta = 0.013$, was taken from Vasilev (2016). It was estimated as the average quarterly depreciation rate over the period

TABLE 1 Model Parameters

Par.	Value	Description	Method
β	0.982	Discount factor	Calibrated
α	0.429	Capital Share	Data average
γ	0.873	Relative weight attached to leisure	Calibrated
δ	0.013	Depreciation rate on physical capital	Data average
τ^y	0.100	Income ta rate	Data average
τ^c	0.200	VAT/consumption tax rate	Data average
ϕ	0.900	Scale parameter, firing costs	Calibrated
ρ_a	0.701	AR(1) persistence coefficient, TFP process	Estimated
σ_a	0.044	st. error, TFP process	Estimated

1999–2014. Finally, the process followed by the TFP process is estimated from the detrended series by running an AR(1) regression and saving the residuals. Table 1 summarises the values of all model parameters used in the paper.

Steady-State

Once the values of model parameters were obtained, and the steady-state equilibrium system solved, the 'big ratios' can be compared to their averages in Bulgarian data. The results are reported in table 2. The steady-state level of output was normalized to unity (hence the level of technology A differs from one, which is usually the normalization done in other studies), which greatly simplified the computations. Next, the model matches consumption-to-output and government purchases ratios by construction; the investment ratios are also closely approximated, despite the closed-economy assumption and the absence of a foreign trade sector. The capital share of income is also identical to those in data, which is an artifact of the assumptions imposed on the functional form of the aggregate production function. The labour share is lower than that in data by the amount of the firing costs. The after-tax return, where $\bar{r} = (1-\tau^y)r-\delta$, is also relatively well-captured by the model. Lastly, given the absence of debt, and the fact that transfers were chosen residually to balance the government budget constraint, the result along this dimension is understandably not so close to the average ratio in data.

Out of steady-state model dynamics

Since the model with firing costs does not have an analytical solution for the equilibrium behaviour of variables outside their steady-state

TABLE 2 Data Averages and Long-run Solution

Variable	Description	Data	Model
y	Steady-state output	N/A	1.000
c/y	Consumption-to-output ratio	0.648	0.674
i/y	Investment-to-output ratio	0.201	0.175
k/y	Capital-to-output ratio	13.96	13.96
g^c/y	Government consumption-to-output ratio	0.151	0.151
wh/y	Labour income-to-output ratio	0.571	0.521
rk/y	Capital income-to-output ratio	0.429	0.429
$\phi h^2/2y$	Firing costs-to-output ratio	0.050	0.050
h	Share of time spent working	0.333	0.333
$\bar{r}$	After-tax net return on capital	0.014	0.016

values, we need to solve the model numerically. This is done by log-linearizing the original equilibrium (non-linear) system of equations around the steady-state. This transformation produces a first-order system of stochastic difference equations. First, we study the dynamic behaviour of model variables in response to an isolated shock to the total factor productivity process, and then we fully simulate the model to compare how the second moments of the model perform when compared against their empirical counterparts.

IMPULSE RESPONSE ANALYSIS

This subsection documents the impulse responses of model variables to a 1% surprise innovation to technology. The impulse response functions (IRFS) are presented in figure 1. As a result of the one-time unexpected positive shock to total factor productivity, output increases upon impact. This expands the availability of resources in the economy, so use of output – consumption, investment, and government consumption also increase contemporaneously.

At the same time, the increase in productivity increases the after-tax return on the two factors of production, labour and capital. The representative household then responds to the incentives contained in prices and starts accumulating capital, and supplies more hours worked. In turn, the increase in capital input feeds back in output through the production function and that further adds to the positive effect of the technology shock. In the labour market, the wage rate increases, and the household increases its hours worked. However, due to the presence of firing costs

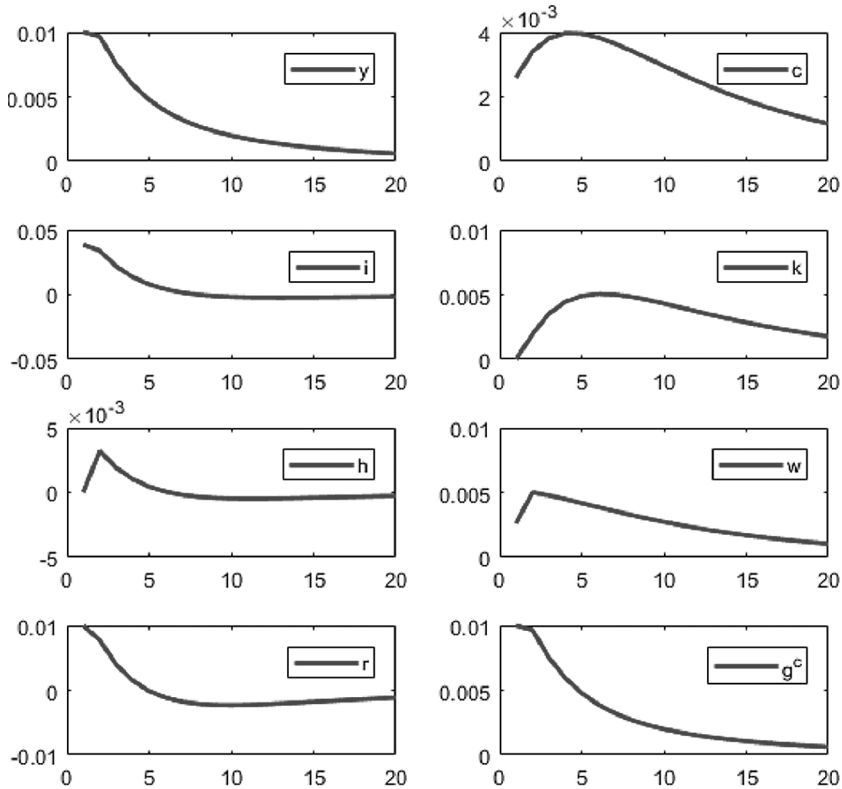

FIGURE 1 Impulse Responses to a 1% surprise innovation in technology

in the framework, hours are predetermined, so the increase in hours happens with a delay, and is dampened, as compared to the case without firing costs. All in all, the increase in total hours further increases output, indirectly and with a delay.

Over time, as capital is being accumulated, its after-tax marginal product starts to decrease, which lowers the households' incentives to save. As a result, physical capital stock eventually returns to its steady-state, and exhibits a hump-shaped dynamics over its transition path. The rest of the model variables return to their old steady-states in a monotone fashion as the effect of the one-time surprise innovation in technology dies out.

SIMULATION AND MOMENT-MATCHING

As in Vasilev (2017b), we will now simulate the model 10,000 times for the length of the data horizon. Both empirical and model simulated data is detrended using the Hodrick-Prescott (1980) filter. Table 3 summarizes

TABLE 3 Business Cycle Moments

Item	Data	Model	RBC	Item	Data	Model	RBC
σ_y	0.05	0.05	0.05	$corr(c,y)$	0.85	0.91	0.90
σ_c/σ_y	0.55	0.82	0.82	$corr(i,y)$	0.61	0.83	0.83
σ_i/σ_y	1.77	2.31	2.35	$corr(g,y)$	0.31	1.00	1.00
σ_g/σ_y	1.21	1.00	1.00	$corr(h,y)$	0.49	0.43	0.59
σ_h/σ_y	0.63	0.17	0.28	$corr(w,y)$	−0.01	0.95	0.96
σ_w/σ_y	0.83	0.83	0.86				
$\sigma_{y/h}/\sigma_y$	0.86	0.83	0.86				

the second moments of data (relative volatilities to output, and contemporaneous correlations with output) versus the same moments computed from the model-simulated data at quarterly frequency. The 'Model' is the case with firing costs, while the 'Benchmark RBC' is a setup without such frictions. In addition, to minimise the sample error, the simulated moments are averaged out over the computer-generated draws. As in Vasilev (2016; 2017b; 2017c), both models match quite well the absolute volatility of output. By construction, government consumption in the model varies as much as output.

In addition, the predicted consumption and investment volatilies in both models are too high. Still, the models are qualitatively consistent with the stylised fact that consumption generally varies less than output, while investment is more volatile than output. The model with firing costs produces smoother investment series, but the quantitative effect is quite small. Overall, the two models are almost indistinguishable from one another.

With respect to the labour market variables, the variability of employment predicted by both models is lower than that in data, and much lower in the case of fixed costs; the variability of wages in the model is very close to that in data. This is yet another confirmation that the perfectly-competitive assumption, even when we allow for quadratic firing costs, does not describe very well the dynamics of labour market variables. Next, in terms of contemporaneous correlations, both models systematically over-predict the pro-cyclicality of the main aggregate variables – consumption, investment, and government consumption. This, however, is a common limitation of this class of models. Along the labour market dimension, the contemporaneous correlation of employment with output is a bit lower than that in data, as the lagged term in the firing cost func-

TABLE 4 Autocorrelations for Bulgarian Data and the Model Economy

Method	Statistic	0	1	2	3
Data	$corr(n_t, n_{t-k})$	1.000	0.484	0.009	0.352
Model	$corr(n_t, n_{t-k})$	1.000	0.952	0.893	0.823
	(s.e.)	(0.000)	(0.029)	(0.056)	(0.081)
Data	$corr(y_t, y_{t-k})$	1.000	0.810	0.663	0.479
Model	$corr(y_t, y_{t-k})$	1.000	0.957	0.905	0.846
	(s.e.)	(0.000)	(0.026)	(0.050)	(0.073)
Data	$corr(a_t, a_{t-k})$	1.000	0.702	0.449	0.277
Model	$corr(a_t, a_{t-k})$	1.000	0.955	0.901	0.837
	(s.e.)	(0.000)	(0.027)	(0.051)	(0.075)
Data	$corr(c_t, c_{t-k})$	1.000	0.971	0.952	0.913
Model	$corr(c_t, c_{t-k})$	1.000	0.958	0.910	0.854
	(s.e.)	(0.000)	(0.025)	(0.048)	(0.070)
Data	$corr(i_t, i_{t-k})$	1.000	0.810	0.722	0.594
Model	$corr(i_t, i_{t-k})$	1.000	0.954	0.896	0.829
	(s.e.)	(0.000)	(0.028)	(0.053)	(0.077)
Data	$corr(w_t, w_{t-k})$	1.000	0.760	0.783	0.554
Model	$corr(w_t, w_{t-k})$	1.000	0.958	0.909	0.853
	(s.e.)	(0.000)	(0.025)	(0.049)	(0.071)

tion makes hours less pro-cyclical. With respect to wages, both models predict strong cyclicality, while wages in data are acyclical. This shortcoming is well known in the literature and the presence of firing costs does not affect these results in any major way.

In the next subsection, as in Vasilev (2015c), we investigate the dynamic correlation between labour market variables at different leads and lags, thus evaluating how well the model matches the phase dynamics among variables. In addition, the autocorrelation functions (ACFS) of empirical data, obtained from an unrestricted VAR(1) are put under scrutiny and compared and contrasted to the simulated counterparts generated from the model.

AUTO- AND CROSS-CORRELATION

This subsection discusses the auto-(ACFS) and cross-correlation functions (CCFS) of the major model variables. The coefficients of the empirical ACFS and CCFS at different leads and lags are presented in ta-

TABLE 5 Dynamic Correlations for Bulgarian Data and the Model Economy

Method	Statistic	−3	−2	−1	0	1	2	3
Data	$corr(h_t, (y/h)_{t-k})$	−0.342	−0.363	−0.187	−0.144	0.475	0.470	0.346
Model	$corr(h_t, (y/h)_{t-k})$	0.014	0.020	0.024	0.362	0.030	−0.029	−0.069
	(s.e.)	(0.328)	(0.287)	(0.237)	(0.289)	(0.212)	(0.246)	(0.280)
Data	$corr(h_t, w_{t-k})$	0.355	0.452	0.447	0.328	−0.040	−0.390	−0.57
Model	$corr(h_t, w_{t-k})$	0.017	0.017	0.016	0.153	−0.032	−0.066	−0.087
	(s.e.)	(0.340)	(0.296)	(0.242)	(0.334)	(0.218)	(0.254)	(0.289)

ble 4 against the averaged simulated AFCS and CCFS. For the sake of economising space, we only provide results for the setup with firing costs.

As seen from table 4, the model compares relatively well vis-à-vis data. Empirical ACFS for output and investment are slightly outside the confidence band predicted by the model, while the ACFS for total factor productivity and household consumption are well-approximated by the model. The persistence of labour market variables is also relatively well-described by the model dynamics. Overall, the model with firing costs generates too much persistence in output and both employment and unemployment, and is subject to criticism in Nelson and Plosser (1982), Cogley and Nason (1995) and Rotemberg and Woodford (1996), who argue that the RBC class of models do not have a strong internal propagation mechanism besides the strong persistence in the TFP process. In those models, e.g. Vasilev (2009), and in the current one with firing costs, a technology shock can be regarded as a factor shifting the labour demand curve, while holding the labour supply curve constant. Therefore, the effect between employment and labour productivity is only a contemporaneous one. As a result, output and unemployment persistence is low. However, as seen from table 5, over the business cycle, in the data, labour productivity leads employment. The model, however, cannot account for this fact.

Conclusions

In this paper, we introduce firing costs in an ad hoc fashion into a real-business-cycle setup augmented with a detailed government sector. We calibrate the model to Bulgarian data for the period following the introduction of the currency board arrangement (1999–2018). We investigate the importance of such labour market frictions for cyclical fluctuations in Bulgaria. Firing costs decrease employment volatility and pro-cyclicality,

where both effects come at odds with data. Besides those, we do not find other important effects of firing costs for business cycle fluctuations in Bulgaria. This result points out that the ad hoc modelling choice was not very suitable in explaining labour market phenomena in Bulgaria, and there is need for further research. Furthermore, this result is conditional on the calibration for Bulgaria, and it is not directly translatable to the context of other countries.

Notes

1 On a different note, Paskaleva (2016), shows that real wages in Bulgaria are indeed downward rigid exactly due to collective agreements in place, which prohibit cuts in base wages.

2 This is later taken to represent at least part of the firing frictions, the effect of which we will investigate quantitatively. Given that aggregate data on such costs is hard to produce, we include this ingredient in a theoretical setup. Thus, the quantitative theory approach was chosen to fill an important niche in the literature.

3 Extending the current work to a more detailed setup, e.g. along the lines of Vasilev (2019), is left for future work. After all, there are several candidates justifying the presence of firing costs, e.g., irreversible human capital investment in the form of specific training, which is lost when a worker leaves the firm; other examples could be the too-generous unemployment benefits, which are also non-taxable, or a relatively high minimum wage rate, among many others. Union premium in the wage rate, and the skill premium, which also represent increase in the labour costs from the perspective of the firm are other directions for research.

4 This period, following the currency board adoption, was chosen because it corresponds to a period of macroeconomic stability, which is necessary for any sensible time series analysis.

5 Note that by choosing k_{t+1} the household is implicitly setting investment i_t optimally.

6 This is in line with Hopenhayn and Rogerson's (1993) modelling approach.

7 This equation is similar to the job creation condition (JCC) in search and matching models, e.g. Vasilev (2016).

8 We performed robustness checks, but it turned out that this parameter does not affect the results quantitatively in any major way.

References

Bentolila, S., and G. Bertola. 1990. 'Firing Costs and Labour Demand: How Bad Is Eurosclerosis?' *Review of Economic Studies* 57 (3): 381–402.

Cogley, T., and J. Nason. 1995. 'Output Dynamics in Real-Business-Cycles.' *American Economic Review* 85 (3): 492–511.

Dunne, T., M. J. Roberts, and L. Samuelson. 1989. 'Plant Turnover and Gross Employment Flows in the U.S. Manufacturing Sector.' *Journal of Labor Economics* 7 (1): 48–71.

Hodrick, R., and E. C. Prescott. 1980. 'Post-War US Business Cycles: An Empirical Investigation.' Unpublished manuscript, Carnegie-Mellon University, Pittsburgh, PA.

Hopenhayn, H., and R. Rogerson. 1993. 'Job Turnover and Policy Evaluation: A General Equilibrium Analysis,' *Journal of Political Economy* 101 (5): 915–38.

Lazear, E. P. 1990. 'Job Security Provisions and Employment.' *The Quarterly Journal of Economics* 105 (3): 699–726.

Nelson, C. R., and C. I. Plosser. 1982. 'Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications.' *Journal of Monetary Economics* 10 (2): 139–62.

Paskaleva, D. 2016. 'Labour Cost and Price Adjustment Practices of Bulgarian Firms in the Period 2009–13.' Discussion Paper 101, Bulgarian National Bank, Sofia.

Rotemberg, J., and M. Woodford. 1996. 'Real-Business-Cycle Models and the Forecastable Movements in Output, Hours, and Consumption.' *American Economic Review* 86 (1): 71–89.

Vasilev, A. 2009. 'Business Cycles in Bulgaria and the Baltic Countries: An RBC Approach.' *International Journal of Computational Economics and Econometrics* 1 (2): 148–70.

———. 2015a. 'Welfare Effects of Flat Income Tax Reform: The Case of Bulgaria.' *Eastern European Economics* 53 (2): 205–20.

———. 2015b. 'Welfare Gains from the Adoption of Proportional Taxation in a General-Equilibrium Model with a Grey Economy: The Case of Bulgaria's 2008 Flat Tax Reform.' *Economic Change and Restructuring* 48 (2): 169–85.

———. 2015c. 'Macroeconomic Effects of Public-Sector Unions.' *Labour* 29 (2): 101–26.

———. 2016. 'Search and Matching Frictions and Business Cycle Fluctuations in Bulgaria.' Bulgarian Economic Papers BEP 03-2016, Sofia University St. Kliment Ohridski, Sofia.

———. 2017a. 'Business Cycle Accounting: Bulgaria after the Introduction of the Currency Board Arrangement (1999–2014).' *European Journal of Comparative Economics* 14 (2): 197–219.

———. 2017b. 'A Real-Business-Cycle Model with Efficiency Wages and a Government Sector: The Case of Bulgaria.' *Central European Journal of Economics and Econometrics* 9 (4): 359–77.

———. 2017c. 'A Real-Business-Cycle Model with Reciprocity in Labor Relations and Fiscal Policy: The Case of Bulgaria.' Bulgarian Economic Papers BEP 03-2017, Sofia University St. Kliment Ohridski, Sofia.

———. 2017d. 'VAT Evasion in Bulgaria: A General-Equilibrium Approach.' *Review of Economics and Institutions* 8 (2): 2–17.

———. 2019. 'Are Labor Unions Important for Business Cycle Fluctuations: Lessons from Bulgaria.' Bulgarian Economic Papers BEP 02-2019, Sofia University St. Kliment Ohridski, Sofia.

Analysis of Key Performance Indicators of Water Service Providers in the Gaza Strip to Achieve UN Sustainable Development Goal 6

Khalil A. Elnamrouty
Islamic University of Gaza, Palestine
knamroty@iugaza.edu.ps

Ramez T. Al Madhoun
Water Sector Regulatory Council, Palestine
r.madhoun@wsrc.ps

This article addresses the causes of instability and non-sustainability of municipal water and wastewater by the 25 Service Providers (SPS) in the Gaza Strip (GS), Palestine. The analysis of Key Performance Indicators (KPIS) of municipal water and wastewater SPS in the GS shows a serious deficiency in the administrative, financial, and operational dimensions; such deficiency affects efforts to achieve the UN Sustainable Development Goal 6 (SDG 6). The deficiencies include inappropriate planning, lack of comprehensive capacity-building programmes, very high levels of Non-Revenue Water, and distortions in the tariff structures of almost all service providers, where the average selling price per m^3 of water was less than the average unit cost of m^3 of water sold. Moreover, levels of collection efficiency were very low, which resulted in a serious cash flow problem for the SPS.' The study has found a lack or absence of accurate or completed customer complaint, satisfaction, and inquiry logs; this is clearly reflected in customer behaviour related to reluctance to pay bills and high levels of illegal connections.

Key Words: Sustainable Development Goal 6 (SDG 6), Key Performance Indicators (KPIS), water sector, Service Providers (SPS), municipalities, Gaza Strip (GS), Palestine
JEL Classification: Q01, Q25, R25

https://doi.org/10.26493/1854-6935.20.19-42

Received: 16 August 2021 · Accepted: 11 October 2021
Published online: 31 March 2022

Introduction

The continuous sophistication of requirements in human lives, in addition to the complications of the inhabitants' and environmental needs, which have resulted from the fast and rapid change in urban develop-

ment, have led to increasing realization and awareness of population needs for potable water to ensure sustainable and positive development of human societies.

The World Bank (2018) has reported that Palestinian Territories face significant and growing shortfalls in the water supply available for domestic use. It was also mentioned that Palestinians living in the Gaza Strip (GS) suffer from complex problems in different aspects of livelihood, including sustainable water and wastewater services. Under the section entitled 'Financial Viability of Water Services in the Palestinian Territories,' it was stated that 'A lack of commercial focus undermines the viability of the sector at multiple levels. Tariffs in both the West Bank and GS are low.'

There are 25 water and wastewater service providers (SPS) in the GS responsible for service provision for almost 2 million inhabitants (24 municipalities and the Coastal Municipalities Water Utility – CMWU). The National Water Sector Strategic Plan and Action Plan 2017–2022 (Palestinian Water Authority 2016) has shown many vulnerabilities, weaknesses and threats facing the water and wastewater SPS in Palestine and has provided a detailed SWOT analysis, that identified the affective factors and priority issues, which form the grounds for starting the identification of the strategic development framework for the Water Sector.

The article's main question is, what are the requirements to achieve UN Sustainable Development Goal 6 (SDG 6) in the GS based on analyses of the Key Performance Indicators (KPIS) data for the year 2019, whereas the sub-questions are:

1. What are the operational (technical, financial, and administrative) problems that may cause deterioration and eventually stop provision of water and wastewater services in the Gaza Strip?
2. What are the requirements to ensure continuity and sustainability of water and wastewater service provision in the Gaza Strip in conjunction with the SDG 6?

The specific objectives of this article are:

1. Identify technical, financial, and administrative weaknesses that jeopardize the continuity and sustainability of water and wastewater service provision in the GS.
2. Quantify the operational status of the water and wastewater services in a specific performance indicator.

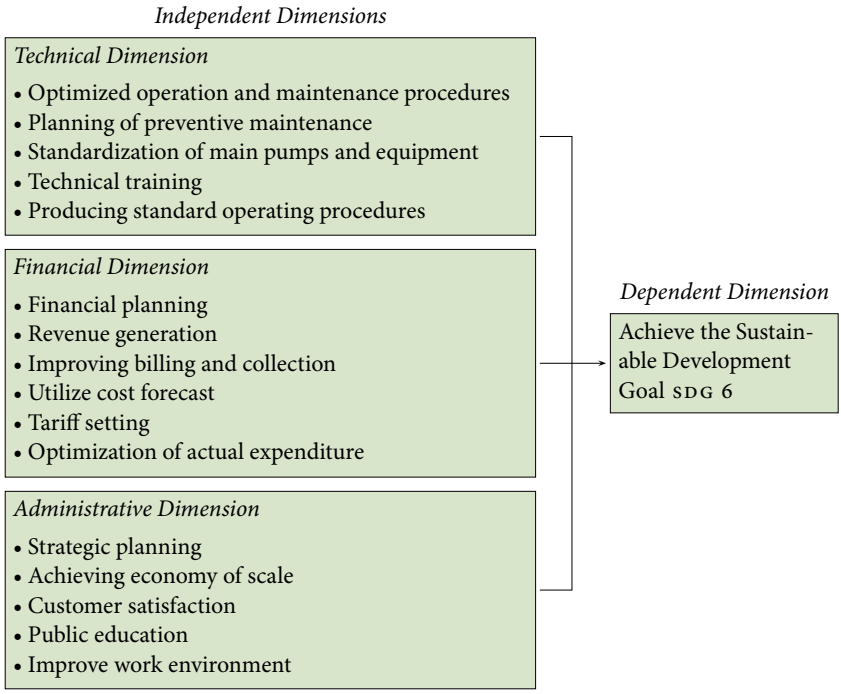

FIGURE 1 Study Dimensions

3. Provide recommendations to ensure operational stability and continuity of water and wastewater service provision by the 25 service providers.

The present study is qualitative and includes both literature and empirical analysis. The collection of cross-sectional data and information of Service Providers (SPS) took place during 2019. There are no correlated statistical links between the data of the 25 SPS due to total independence in operations, water and wastewater networks, and administrative and financial systems of each service provider. Hence MS Excel software is most suitable to tabulate, produce individual indicators and sort data. The Descriptive/Narrative information resulting from the questionnaires and structured interviews were summarized to produce direct numerical weights and percentages from them. Therefore, MS Excel is ideal for this exercise.

The first section includes the study's background, research questions, objectives, and methodology. The second section briefly describes the structure of the water sector in Palestine. The third section discusses re-

lated previous literature. The fourth section describes operational results compared to benchmarks. The fifth section present findings of data analysis. The sixth section shows the cause-effect matrix and its details. The seventh section includes recommendations to improve technical, financial, and administrative dimensions.

Structure of the Water Sector in Palestine

There are three main levels of stakeholders in the water and wastewater sector in Palestine:

1. The Service Providers (SPS)
2. The Regulators
3. Other Local and International Entities/Donors

THE SERVICE PROVIDERS (SPS)

The GS is divided into 25 municipalities across 5 governorates. The municipalities vary in the geographic size and number of populations. The 25 municipalities are the official SPS of water and wastewater services through municipal networks.

Rafah municipality has joined the Coastal Municipalities Water Utility (CMWU), which is a joint services council under the supreme umbrella of the Ministry of Local Government. Rafah Municipality is still legally responsible for water and wastewater services in Rafah city and refugee camps, although CMWU is responsible for all operational and financial services in that area.

THE REGULATORS

The regulators of the water sector in Palestine are:

- Palestinian Water Authority (PWA).
- The Ministry of Local Government (MOLG).
- Water Sector Regulatory Council (WSRC).
- Ministry of Health (MOH).

OTHER LOCAL AND INTERNATIONAL ENTITIES/DONORS

There are different local and international entities/stakeholders, who affect the water and wastewater sector in Palestine and in particular the GS. The United Nations Relief and Works Agency for Palestine Refugees in the Near East is still responsible for water provision in Jabalia refugee camp, but not for the wastewater collection network.

TABLE 1 Water Service Providers in Gaza Strip

Municipality	Local communities served	(1)	(2)
Um Ennaser	Um Ennaser city	5,010	5,010
Beit Hanoun	Beit Hanoun city	55,248	55,248
Beit Lahiya	Beit Lahiya city	95,016	95,016
Jabalia al Nazla	Jabalia refugee camp	52,313	234,971
	Jabalia city	182,658	
Gaza	Shati refugee camp	42,361	656,432
	Gaza city	614,071	
Wadi Gaza	Wadi Gaza city	4,769	4,769
Mughraga	Mughraga city	11,916	11,916
Zahra	Zahra city	5,551	5,551
Nusairat	Nusairat refugee camp	33,243	90,678
	Nusairat city	57,435	
Buraij	Buraij refugee camp	29,344	45,565
	Buraij city	16,221	
Maghazi	Maghazi refugee camp	19,012	29,138
	Maghazi city	10,126	
Zawaida	Zawaida city	24,964	24,964
Musaddar	Musaddar city	2,709	2,709
Dair Al Balah	Dair al Balah refugee camp	7,314	85,985
	Dair al Balah city	78,671	
Wadi as Salga	Wadi as Salga city	7,031	7,031
Qarara	Qarara city	30,488	30,488
Khan Younis	Khan Younis refugee camp	43,289	258,910
	Khan Younis city	215,621	
Bani Suhaila	Bani Suhaila city	43,559	43,559
Abasn Kabira	Abasn Kabira city	28,137	28,137
Abasan Jadida	Abasan Jadida city	9,765	9,765
Khuza'a	Khuza'a city	11,971	11,971
Fukhary	Fukhary city	6,773	6,773
Nasser	Nasser city	9,426	9,426
Shuka	Shuka city	17,254	17,254
Rafah	Rafah city	180,354	218,702
	Rafah refugee camp	38,348	
Total			1,989,968

NOTES Column headings are as follows: (1) no. of population per community, 2019, (2) total population, 2019. Based on data from Palestinian Central Bureau of Statistics (http://www.pcbs.gov.ps/site/lang__en/803/default.aspx).

The International Bank for Reconstruction and Development (IBRD), The United Nations International Children's Emergency Fund (UNICEF), The United Nations Development Programme (UNDP), The International Committee of the Red Cross (ICRC), Office of the Quartet Committee (OQ), Japan International Cooperation Agency (JICA), Kreditanstalt

für Wiederaufbau – German Development Bank (KFW), French Development Agency (AFD), Austrian Development Agency (ADA), Kuwait Fund For Arab Economic Development (KFAED), Netherlands Development Cooperation and other funding/aid agencies provide technical and financial support to the water and wastewater sector in the GS through the Palestinian Water Authority (PWA) and Coastal Municipalities Water Utility (CMWU) and through projects implemented by International Non-Governmental Organizations (INGO's) and Non-Governmental Organizations (NGO's) working in the sector.

The Water, Sanitation and Hygiene (WASH) cluster was formed in Gaza in 2009 and works under the general umbrella of the United Nations Organization humanitarian coordinator, with direct coordination with the UNICEF & United Nations Office for the Coordination of Humanitarian Affairs (OCHA). The WASH cluster coordinates humanitarian aid/support and projects carried out by the INGO's and NGO's in the GS that are directed towards water sanitation and hygiene.

All the above entities either provide infrastructure projects or emergency response and humanitarian support related to water and wastewater services (coordination for chemicals and spare parts entry, for example). Nevertheless, none provides the necessary support for municipalities/SPS to maintain/sustain their services from a solid business point of view.

Literature Review

The researchers have carried out an in-depth revision of previous studies, reports and articles. This study contributes to the literature on SDGS and economic growth and brings, as a novelty, the analysis of the nexus relationship between performance indicators of water service providers and SDG 6 in the GS.

Berg (2020) concluded that benchmarking initiative needs to be embedded in a regulatory system that goes beyond the regulatory agency and the water utility operator to include stakeholders (including customers, Ministries, and citizens without quality service). Berg also found that domestic politics and tribalism can limit the effectiveness of regulatory institutions and that stakeholders need to have a shared vision, even if they have different preferred strategies for meeting objectives.

Smith et al. (2020) found that utilizing mixed methods can illuminate important gaps in the progress towards achieving the SDGS 3 and 6 by 2030. Guppy, Mehta, and Qadir (2019) showed there are two potential

gaps in the SDG 6 indicator framework. First, between the aspirations captured in SDG 6 targets and what will be measured by the relevant indicators. Second, between what is being measured in 'means of implementation' indicators and what the key means of implementation achievements of many countries are expected to be under SDG. Paoli and Addeo (2019) suggested that a composite index for each SDG to measure SDG achievement across the 17 goals should be created and explores the social, environmental, and economic dimensions of SDGS as defined by the EU.

Ortigara, Kay, and Uhlenbrook (2018) found that education, training, and research could contribute to enable and accelerate progress towards achieving SDG 6. Weststrate et al. (2019) concluded that SDG 6 indicators fail to report (lack transparency) whether progress has been made through centralized piped infrastructure or decentralized options. Barbier and Burgess (2017) have shown that it is possible to develop the system approach to sustainability to make such welfare assessments, and more importantly, such an approach is directly relevant to the 2030 Sustainable Development Agenda of the United Nations (https://www.un.org/sustainabledevelopment). This approach is directly relevant to the 17th SDG, as each one of these goals can be attributed to economic and environmental systems and there are clear trade-offs in attempting to attain progress across these goals.

Smith et al. (2020), Paoli and Addeo (2019), and Weststrate et al. (2019) concluded there is a serious need to utilize mixed data collection and to illuminate important gaps in the progress towards achieving the SDGS 3 and 6 by 2030, as well as the need to create a composite index for each SDG to measure SDG achievement across the 17 goals. They propose indicators that distinguish advancements made with regard to piped infrastructure and decentralized infrastructure and propose adding regulation as a parameter to the SDG 6 indicators, especially for decentralized infrastructure. Hutton and Varughese (2016) mention that the global costs of achieving universal basic WASH by the year 2030 are achievable under current overall sector spending. Moreover, resources need to be shifted to basic sanitation and hygiene in countries where the service gap is greatest. The Palestinian Water Authority (2016) concluded that development issues should be identified and highlighted clearly, and water sector projects should be aligned to achieve PWA strategic vision of improving the levels of water services in Palestine.

Berg and Phillips (2017) advised that it is important to publicize information about trends over time and performance patterns across sup-

pliers, because without financial and operating statistics, it is difficult (if not impossible) to evaluate sector performance and to identify the strengths and weaknesses of current regulatory and managerial arrangements. There is a need for a permanent regulatory effort related to data collection and verification, and the operating utility needs to invest in robust information systems if managers are, indeed, going to manage.

Walters and Javernick-Will (2015) concluded that sustainability of rural water infrastructure in developing countries is largely affected by the dynamic and systemic interactions of technical, social, financial, institutional, and environmental factors that can lead to premature water system failure. Han et al. (2015) show that local administrators are focusing on selecting the highest priority for a management area through a risk-based approach or by allocating additional funds for sustainable water management. Waage et al. (2015) propose a framework for classifying and clustering goals and their interactions, identify the different problem structures and challenges for good governance, propose potential solutions, show why different goals interact positively or negatively, and where and why governing these interactions can lead to a 'win-win,' as well as where governing these interactions is a much more politically difficult challenge. Lo Storto (2011) found that there are important inefficiencies in the water service management industry in Italy. In particular, there is a number of Aree Territoriali Ottimali (ATO) that are inefficient due to their size. The inefficiency is not only due to the scarcely effective use of inputs (i.e. the number of employees, the amount of operative costs, etc.) but also to an unbalanced size of the ATOs. Whittington et al. (2009) suggested that policymakers and donors need to know what improved services are worth to people in developing countries, not only to assess the wisdom of water and sanitation investments. Marques, da Cruz, and Pires (2015), and Marques and Monteiro (2001), discussed the concept of 'sustainable water services' and suggested a multicriteria method to assess it. They developed a proposal of 50 indicators divided into five groups, which are structural indicators, operational indicators, water and service quality indicators, personnel indicators and economic indicators. The studies found that a low performance in a given criterion should automatically mean that the global sustainability score cannot be above a certain threshold (irrespective of the actual performance in all the other criteria); the 'veto power' of some criteria would require the use of non-compensatory models to perform a global evaluation,

Literatures discussed the strategic planning for service provision, the

prerequisites needed for water and wastewater projects to operate in a sustainable manner and management of services beyond first installation, and continuity of the service provision from the administrative, technical, financial and customer participation/satisfaction point of view. It was concluded that utilizing mixed methods in data collection and analysis can illuminate important gaps in the progress towards achieving the SDGS 3 and 6 by 2030 and can increase the community-level knowledge base. Moreover, there is urgent need for more data and improved monitoring to assess SDG 6 progress and to enhance decision-making. The need to address the serious lack of human and institutional capacity that was constraining progress towards achieving SDG 6 was discussed.

The current article addresses, first, the services providers in Gaza Strip, second, sustainability of services only regardless of the quality of water, and third, sustainability of services of a region of scarce resources and bad quality, while previous studies addressed bad management and scarce resources yet of good quality.

Operational Results Compared to Benchmarks

The following matrix provides a visual indicator about the status of each performance indicator and the 'distance to frontier' to reach the minimum benchmark requirements. The matrix can be read according to the following instructions:

1. All numbers should be read in their absolute values.
2. The (+) or (–) sign in front of any value indicates the distance from the benchmark.
3. The distance to frontier is calculated as follows:
   - For numerical values:
     $$\frac{\text{benchmark value} - \text{indicator's value}}{\text{benchmark value}} \times 100.$$
   - For percentage values:
     $$\text{benchmark value in \%} - \text{indicator's value in \%}.$$
4. The negative sign (–) in some benchmarks like 'average daily per capita water consumption at domestic level' is a good thing as it means that the value of the actual indicator is higher than the minimum benchmark, while the positive sign or number indicates the gap to be bridged to reach the benchmark.

5. The triangles (△) are always positive indicators, i.e. the actual value of the performance indicator has reached or succeeded the minimum bench mark value by the indicated absolute percentage value.
6. The circles (○) are always negative indicators, i.e. the actual value of the performance indicator is behind the minimum benchmark value and needs to be improved by the indicated absolute percentage value.
7. The diamond (◇) means that either there is no specific benchmark for this indicator or the components of the respective indicator are independent factors affecting other indicators, such as 'Operating costs per m^3 of water sold,' as this indicator affects the 'Average selling price per m^3 of water,' hence the operating costs constitute a benchmark for the selling price to achieve full cost recovery.
8. Empty or N/A cells mean either the data were not created in first place, i.e. microbiological test, where not all networks in all municipalities were tested, or it means that the situation is not applicable, i.e. collection efficiency of wastewater service, as there are 6 SPS with no wastewater collection network.

Data Analysis

After analysing the KPIS and making comparisons with applicable benchmarks, we concluded that there are serious weaknesses that are putting at risk the continuity and sustainability of the water and wastewater service provision:

- There are serious deficiencies in the administrative, financial and operations dimensions of the water and wastewater SPS in the GS.
- The deficiencies include lack of proper short-, medium- and long-term planning, absence of standard operating procedures, absence or lack of a comprehensive capacity building programme and an improper performance evaluation system.
- There are high levels of NRW that reached 40.16% for the GS as one operational unit, which constitute a serious waste of resources, both natural and financial.
- NRW reduces the revenue of SPS while keeping the overall operation costs unchanged, which is reflected in the higher unit cost of production and distribution of the quantities of water sold.

TABLE 2 Benchmark Comparison Matrix

((KPIS)s)	Unit	Large Service Provider									Medium Service Provider										Small Service provider									
		Nusairat	Jabalia al Nazla	Khan Younis	Gaza city	CMWU -Rafah	Dair al Balah		Beit Lahiya	Buraij	Zawaida	Qarara	Maghazi	Bani Suhaila	Beit Hanoun	Abasan Kabira		Zahra	Shuka	Fukhary	Musaddar	Mughraga	Nasser	Um Ennaser	Khuza'a	Abasan Jadida	Wadi as Salga	Wadi Gaza	
Technical Indicators																														
Average daily per capita water consumption at domestic level	l/c/d	84	99	70	85	75	68		85	78	70	96	82	95	98	111		161	76	112	117	90	119	109	130	100	63	73		
Benchmark	100																													
Current status																														
Distance to frontier	%	16%	1%	30%	15%	25%	32%		15%	22%	30%	4%	18%	5%	2%	-11%		-61%	24%	-12%	-17%	10%	-19%	-9%	-30%	0%	37%	27%		
Average daily water sold per capita based on total population served	l/c/d	84	103	77	96	76	73		86	79	91	98	82	97	101	122		167	78	113	118	91	121	111	131	102	72	77		
Benchmark	120																													
Current status																														
Distance to frontier	%	30%	14%	36%	20%	37%	39%		28%	34%	24%	18%	32%	19%	16%	-2%		-39%	35%	6%	2%	24%	-1%	8%	-9%	15%	40%	36%		
Average daily per capita water consumption per connection	l/con/d	867	1256	846	1217	797	745		800	712	759	1000	800	782	981	834		734	827	627	772	575	677	825	806	729	753	333		
Benchmark	N/A																													
Non-Revenue Water by volume	%	40%	37%	23%	42%	38%	56%		55%	42%	36%	39%	49%	29%	54%	22%		25%	38%	25%	44%	58%	14%	29%	19%	22%	25%	29%		
Benchmark (less than)	28%																													
Current status																														
Distance to frontier	%	-12%	-9%	5%	-14%	-10%	-28%		-27%	-14%	-8%	-11%	-21%	-1%	-26%	6%		3%	-10%	3%	-16%	-30%	14%	-1%	9%	6%	3%	-1%		
Non-Revenue Water per connection per day	l/c/d	568	729	263	881	479	1065		997	507	421	645	760	320	1133	234		242	393	213	601	803	114	335	195	209	283	134		
Benchmark	N/A																													

Continued on the next page

TABLE 2 *Continued from the previous page*

(KPIS)	Unit	Large Service Provider								Medium Service Provider								Small Service provider								
		Nusairat	Jabalia al Nazla	Khan Younis	Gaza city	CMWU -Rafah	Dair al Balah	Beit Lahiya	Burayj	Zawaida	Qarara	Maghazi	Bani Suhaila	Beit Hanoun	Abasan Kabira	Zahra	Shuka	Fukhary	Musaddar	Mughraga	Nasser	Um Ennaser	Khuza' a	Abasan Jadida	Wadi as Salga	Wadi Gaza
Financial Indicators																										
Average selling price per m^3 of water	NIS	1.85	1.21	1.84	0.95	1.37	1.85	1.23	1.82	1.81	1.6	1.91	2.41	1.89	2.12	1.55	1.19	1.46	2	1.57	1	1	2.35	2.55	1.49	2.54
Benchmark	≥operation costs per m^3 water billed	●	●	●	●	●	●	●	●	▲	●	●	●	▲	●	●	●	●	▲	●	●	●	●	▲	●	●	●
Current status																										
Distance to frontier	%	8%	8%	13%	64%	19%	36%	39%	14%	-46%	21%	28%	45%	-17%	60%	12%	28%	55%	-13%	4%	73%	51%	43%	-4%	18%	5%
Operating costs per m3 of water sold	NIS	2.02	1.32	2.12	2.65	1.69	2.87	2	2.12	1.24	2.02	2.64	4.42	1.62	5.35	1.77	1.66	3.22	1.77	1.63	3.69	2.05	4.09	2.45	1.82	2.68
Benchmark	N/A	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Collection efficiency-water service	%	34%	48%	38%	22%	34%	23%	45%	27%	26%	43%	21%	33%	38%	25%	68%	19%	38%	41%	40%	58%	24%	53%	31%	43%	34%	61%
Benchmark (equal or greater than)	95%	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Current status																										
Distance to frontier	%	61%	47%	57%	73%	61%	72%	50%	68%	69%	52%	74%	62%	57%	70%	27%	76%	57%	54%	55%	37%	71%	42%	64%	52%	61%	24%
Collection efficiency-waste water service	%	24%	12%	9%	26%	35%	28%	40%	14%	23%	46%	23%	5%	31%		75%	4%		38%	13%		27%					
Benchmark (equal or greater than)	90%	●	●	●	●	●	●	●	●	●	●	●	●	●	◆	●	●	◆	●	●	◆	●	◆	◆	◆	◆	◆
Current status																										
Distance to frontier	%	66%	78%	81%	64%	55%	62%	50%	76%	67%	44%	67%	85%	59%	90%	15%	86%	90%	52%	77%	90%	63%	90%	90%	90%	71%	19%
Working ratio (Efficiency Ratio) -	No.	1.21	0.73	0.92	1.85	1.37	2.2	1.74	1.43	0.91	1.35	1.55	1.39	1.14	2.44	1.37	1.86	2.06	1.28	0.85	3.43	2.79	1.69	0.89	1.34	0.96

Continued on the next page

TABLE 2 *Continued from the previous page*

(KPIS)		water & wastewater service: Benchmark (equal or less than) / Current status	Distance to frontier	Liquidity ratio (current ratio)	Benchmark (equal or greater than) / Current status	Distance to frontier	Cash ratio	Benchmark (equal or greater than) / Current status	Distance to frontier	Operating costs per m3 of wastewater	Benchmark (equal or less than fees per m3 of wastewater collected & treated)
Unit		1	%	No.	1	%	No.	1	%	NIS	
Nusairat	Large Service Provider	●	-21%	1.1	▲	-7%	0	●	100%	0.73	◆
Jabalia al Nazla	Large Service Provider	●	27%	2.3	▲	-132%	0	●	100%	1.02	◆
Khan Younis	Large Service Provider	◆	8%	1.2	▲	-18%	0	●	100%	1.76	◆
Gaza city	Large Service Provider	●	-85%	1.5	▲	-51%	0	●	97%	0.85	◆
CMWU -Rafah	Large Service Provider	●	-37%	1.5	▲	-45%	0	●	99%	1.31	◆
Dair al Balah	Large Service Provider	●	-120%	2.2	▲	-122%	0	●	99%	2.33	◆
Beit Lahiya	Medium Service Provider	●	-74%	1.93	▲	-93%	0	●	100%	1.1	◆
Buraij	Medium Service Provider	●	-43%	1.2	▲	-24%	0	●	99%	1.25	◆
Zawaida	Medium Service Provider	◆	9%	1.7	▲	-70%	0	●	100%	0.92	◆
Qarara	Medium Service Provider	●	-35%	0.6	●	40%	0	●	100%	0.36	◆
Maghazi	Medium Service Provider	●	-55%	1.4	▲	-43%	0	●	100%	1.31	◆
Bani Suhaila	Medium Service Provider	●	-39%	0.8	●	20%	0	●	100%	1.14	◆
Beit Hanoun	Medium Service Provider	●	-14%	0.7	●	27%	0	●	97%	1.22	◆
Abasan Kabira	Medium Service Provider	●	-144%	0.5	●	54%	0	●	100%	0	◆
Zahra	Small Service provider	●	-37%	6.6	▲	-558%	2.1	▲	-114%	1.4	◆
Shuka	Small Service provider	●	-86%	2.5	▲	-152%	0	●	100%	1.17	◆
Fukhary	Small Service provider	●	-106%	1.3	▲	-26%	0	●	99%	0	◆
Musaddar	Small Service provider	●	-28%	1.3	▲	-32%	0	●	100%	1.46	◆
Mughraga	Small Service provider	◆	15%	2.6	▲	-164%	0	●	100%	1.23	◆
Nasser	Small Service provider	●	-243%	4.6	▲	-364%	0.1	●	95%	0	◆
Um Ennaser	Small Service provider	●	-179%	1.1	▲	-13%	0	●	100%	1.86	◆
Khuza' a	Small Service provider	●	-69%	4.3	▲	-329%	0	●	99%	0	◆
Abasan Jadida	Small Service provider	◆	11%	0.5	●	52%	0	●	100%	0	◆
Wadi as Salga	Small Service provider	●	-34%	3	▲	-202%	0	●	99%	0.35	◆
Wadi Gaza	Small Service provider	◆	4%	5.8	▲	-482%	0.2	●	83%	1.42	◆
Quality Indicators											

Continued on the next page

TABLE 2 *Continued from the previous page*

Water samples **(taken from network including mains)** containing free chlorine residual (RC)	Benchmark (equal to or more than 95% of samples contain free chlorine residual) – Current status	Distance to frontier	Water samples **(taken at source)** free from total coliform contamination	Benchmark (equal to or more than 95% of samples free of total coliform) – Current status	Distance to frontier	Water samples **(taken at source)** free from faecal coliform contamination	Benchmark (equal to or more than 95% of samples free of faecal coliform) – Current status	Distance to frontier	Microbiological tests carried out	Benchmark (WHO standard, relevant to number of water sources and population)
%	95%	%	%	95%	%	%	95%		%	N/A
100.00%	▲	-5%	100.00%	▲	-5%	100.00%	▲	-5%	49.80%	◆
100.00%	▲	-5%	100.00%	▲	-5%		◆	N/A	41.30%	◆
98.80%	▲	-4%	100.00%	▲	-5%	100.00%	▲	-5%	118.10%	◆
95.40%	▲	0%	88.00%	●	7%	90.40%	●	5%	117.40%	◆
100.00%	▲	-5%		◆	N/A		◆	N/A	54.00%	◆
100.00%	▲	-5%	70.60%	●	24%	88.20%	●	7%	155.60%	◆
80.80%	●	14%		◆	N/A		◆	N/A	0.00%	◆
100.00%	▲	-5%		◆	N/A		◆	N/A	70.20%	◆
100.00%	▲	-5%	100.00%	▲	-5%	100.00%	▲	-5%	303.60%	◆
98.40%	▲	-3%		◆	N/A		◆	N/A	0.00%	◆
100.00%	▲	-5%	83.30%	●	12%	100.00%	▲	-5%	84.40%	◆
100.00%	▲	-5%	100.00%	▲	-5%	97.60%	▲	-3%	168.30%	◆
100.00%	▲	-5%		◆	N/A		◆	N/A	0.00%	◆
100.00%	▲	-5%		◆	N/A		◆	N/A	0.00%	◆
100.00%	▲	-5%		◆	N/A		◆	N/A	230.80%	◆
100.00%	▲	-5%		◆	N/A		◆	N/A	0.00%	◆
100.00%	▲	-5%		◆	N/A		◆	N/A	0.00%	◆
98.60%	▲	-4%		◆	N/A		◆	N/A	41.70%	◆
100.00%	▲	-5%	0.00%	◆	N/A		◆	N/A	47.60%	◆
100.00%	▲	-5%		◆	N/A		◆	N/A	0.00%	◆
96.50%	▲	-2%		◆	N/A		◆	N/A	0.00%	◆
100.00%	▲	-5%		◆	N/A		◆	N/A	0.00%	◆
100.00%	▲	-5%		◆	N/A		◆	N/A	0.00%	◆
98.60%	▲	-4%		◆	N/A		◆	N/A	50.00%	◆
98.60%	▲	-4%		◆	N/A		◆	N/A	33.30%	◆

Continued on the next page

TABLE 2 *Continued from the previous page*

(KPIS)	Unit	Large Service Provider								Medium Service Provider										Small Service provider									
CUSTOMER SATISFACTION		Nusairat	Jabalia al Nazla	Khan Younis	Gaza city	CMWU -Rafah	Dair al Balah			Beit Lahiya	Burayj	Zawaida	Qarara	Maghazi	Bani Suhaila	Beit Hanoun	Abasan Kabira			Zahra	Shuka	Fukhary	Musaddar	Mughraga	Nasser	Um Ennaser	Khuza' a	Abasan Jadida	Wadi as Salga	Wadi Gaza
Service Complaints per customer - water service	No.	0.13	0.04	0	0.04	0.36	0.08	0.02	0.01	0.05	0	0.03	0	0	0.46	1.28	0	0.08	0.01	0	0.78	0	0	0	0.08	0.03	0	0	0	0.14
Service Complaints per customer - wastewater service	No.	0.08	0.01	0	0	0.16	0.02	0.01	0.01	0.01	0	0	0	0	0.18	0.08		0.09	0.01	0	0.02	0	0	0		0.01				0.09
Continuity Complaints (%)	%	42%	8%		26%	28%	17%	17%	8%	33%		37%			41%	9%	40%	25%	38%		18.30%				23%	38%				25%
Water Quality Complaints (%)	%	4%	15%		7%	0%	8%	8%	15%	0%		5%			3%	1%	0%	14%	24%		0.00%				8%	24%				14%
Billing Complaints and Queries (%)	%	47%	46%		3%	45%	56%	56%	46%	44%		45%			50%	68%	60%	53%	24%		66.20%				54%	24%				53%
Other Complaints and Queries (%)	%	7%	31%		64%	27%	18%	18%	31%	22%		13%			6%	22%	0%	9%	14%		15.50%				15%	14%				9%
Benchmark	N/A																													

NOTES Based on data collected from SP's for 2019.

- There are distortions in the tariff structures of almost all service providers, where the average selling price per m^3 of water was less than the average unit cost of m^3 of water sold. This means that the financial situation of SPS is deteriorating with time.
- Levels of collection efficiency were very low, which resulted in a serious cash flow problem for the SPS' that has an immediate effect on the ability of SPS to meet short-term financial obligations including staff salaries, operation and maintenance needs and others, which jeopardizes the continuity and sustainability of services.
- The cash ratio for almost all SPS reaches zero or very close to zero, resulting in a serious inability of SPS to respond to their short-term financial obligations. The cash ratio confirms the conclusion about the indicator of low collection efficiency.
- There is a lack or absence of accurate or completed customer complaint, satisfaction and inquiry logs, which shows a serious gap in customer service and satisfaction planning and procedures.
- This is clearly reflected in customer commitment to payment of service bills and customer behaviour, which is reflected in high levels of illegal connections, which are a major part of NRW quantities.
- Most of the SPS do not provide the public with technical and financial information that clarifies the crisis in the water and wastewater services and real obstacles. The lack of information, and hence transparency, has made people less understanding of the problems facing the SPS and caused an increase in the level of complaints about non-stability of the services.

Cause/Effect Matrix

The cause-effect matrix illustrates the effect of technical, financial and administrative deficiencies on the sustainability of water and wastewater services. The cause-effect matrix shows the consequences of an inadequate level of water services represented in KPIS on quality of life, and the behaviour of population on short and medium ranges as 'sub-effects,' whereas effects on SDG 6 are concluded in the 'main effects.'

One of the main questions asked to officials of the 8 SPS that are serving more than 80% of the population of the GS is, 'Does the tariff reflect the National plans to achieve the SDG 6?' There were 5 negative answers and 2 'I don't know.' Moreover, the Palestinian Authority/Prime Minister's office created a national team to follow up the process of setting the

TABLE 3 Cause/Effect Matrix

		Cause		Effect	
		Indicator	Details	Sub-effects	Main effects
Technical Indicators	1	Low average daily water sold per capita based on total population served	Insufficient water supply for homes, public services, and private sector businesses. Intermittent supply of unscheduled or disturbed schedule of supply.	Deterioration of public services such as health, education and social services. Commercial businesses will tend to look for alternative sustainable and reliable water supplies such as digging private wells, or purchase water from private vendors. Lack of confidence in service providers.	Waste of economic resources of businesses and Municipalities. Threat to sustainability of service provision. Not reaching SDG 6.
	2	High NRW by volume	SPS abstract larger quantities of water than they actually bill. Extra operation costs carried out by service providers. Unbilled consumption of some public and municipal buildings. No calibration or maintenance for customers and bulk production meters.	Some customers do not receive their share of water. Loss of natural resources (water). Loss of revenue for the service provider. Higher costs of operation.	Deterioration of service levels. Financial hardships to service provider. Higher levels of vandalism to network. Threat to sustainability of service provision. Not reaching SDG 6.
Financial Indicators	3	Average selling price per m^3 of water not covering operational cost	If less than average unit operating cost, service provider's revenues are not sufficient to cover operating costs. Inadequate tariff setting process.	Service provider faces financial difficulties. Less funds allocated for maintenance.	Continuous deterioration in service provider's strategic assets. Establishment reaches bankruptcy. Threat to sustainability of service provision. Not reaching SDG 6.
	4	High operating costs per m^3 of water sold	Bad or inadequate maintenance raises cost. Absence of standard operating procedures. Unjustified administrative costs. High energy cost.	Loss of internal resources. Loss of financial resources. Deterioration in level of service. Accumulation of debts to external vendors (example: electricity company).	Deteriorated level of service. Sustainability of services is doubtful. Not reaching SDG 6.
	5	Low collection efficiency – water service	Low collection rates of water charges. Inadequate treatment of old debts. Inadequate customer service. Inadequate public awareness about service provider's activities.	SPS suffer from cash crisis in general. Less funds available for operation and maintenance of water plants. Deterioration in the condition of water assets. Salaries for water service staff not paid.	Deteriorated level of service. Sustainability of services is doubtful. Not reaching SDG 6.

Continued on the next page

necessary plans and propose regulations to achieve the UN 17th SDGS.

The Palestine State Audit and Administrative Control Bureau con-

TABLE 3 *Continued from the previous page*

	Cause		Effect	
	Indicator	Details	Sub-effects	Main effects
6	Collection efficiency – waste water service	Low collection rates of wastewater fees. Inadequate treatment of old debts. Inadequate customer service.	Less funds available for operation and maintenance of wastewater plants. Deterioration in the condition of wastewater assets. Salaries for wastewater service staff not paid in full or on time.	Deteriorated level of service. Sustainability of services is doubtful. Not reaching SDG 6.
7	Greater than '1' working ratio (efficiency ratio) – water and wastewater service[1]	Inadequate operation schemes raise operation costs. Absence of preventive maintenance plan raises operation and post maintenance costs. Structural deficiency in tariff structure and business planning which negatively affect operating revenue.	Lack of funds for operation and maintenance of water and wastewater facilities. Deterioration in conditions of assets. Service provider faces financial hardship, requests loans with interest or waits for donations. No funds for future development and enhancement of level of service.	Continuous deterioration in service provider's strategic assets. Establishment reaches bankruptcy. Threat to sustainability of service provision. Not reaching SDG 6.
8	Smaller than '1' liquidity ratio (current ratio)[2]	Current assets are not sufficient to meet current liabilities. Most current assets are old debts with high doubts of collection. Current liabilities are related to operation and maintenance costs.	Mid-term and continuous cash crisis. Service provider has to reduce costs which affects level of service. Service provider faces legal law suits and negative consequences.	Continuous deterioration in service provider's strategic assets. Establishment reaches bankruptcy. Threat to sustainability of service provision. Not reaching SDG 6.
9	Smaller than '1' cash ratio[3]	Collection rates are very low. Absence of cash flow management plan. Current liabilities are increasing due to increase of operation costs. Tariff structures are not well planned.	Midterm and continuous cash crisis. Service provider has to reduce costs, which affects level of service. Service provider faces legal law suits and negative consequences.	Continuous deterioration in service provider's strategic assets. Establishment reaches bankruptcy. Threat to sustainability of service provision. Not reaching SDG 6.
10	High operating costs per m^3 of wastewater	Some cost items are very high. Absence of cost centres. Absence of SOP and preventive maintenance.	Shortage in spare parts and maintenance items. Deterioration in wastewater collection network and overflows. Incomplete or non-treated wastewater pumped directly to sea or in open lagoons. Increase of health hazards related to wastewater pollution.	Deteriorated level of service. Sustainability of services is doubtful. Not reaching SDG 6.

Continued on the next page

ducted a review of the Palestinian government's preparedness to implement the 17th SDGS by 2030. The audit took place in 2017 and the report entitled 'Review of the Palestinian Government Preparedness for the Sus-

TABLE 3 *Continued from the previous page*

		Cause		Effect	
	Indicator	Details		Sub-effects	Main effects
Quality Indicators	11 Less than 95% positive results of water samples (taken from network incl. mains) containing free chlorine residual (RC)	Presence of residual chlorine sampling & monitoring programme.		If successful, low health hazards, contamination. Fewer customer complaints. Higher confidence in supply system. More appreciation for role of service provider and increase of willingness to pay bills.	If no compliance, serious water borne diseases and community disturbance. Potential law suits and administrative crisis and extra cost. Deterioration in level of service. Sustainability of services is doubtful. Not reaching SDG 6.
	12 Less than 95% positive results of water samples (taken at source) free from total coliform contamination	Absence of comprehensive microbiological sampling and monitoring programme.		Higher health hazards to public. High risk of contaminated sources. Higher maintenance cost. Less customer confidence. Loss of revenue due to less willingness to pay.	If no compliance, serious water-borne diseases and community disturbance. Potential law suits and administrative crisis and extra cost. Deterioration in level of service. Sustainability of services is doubtful. Not reaching SDG 6.
	13 Less than 95% positive results of water samples (taken at source) free from faecal coliform contamination.	Absence of comprehensive microbiological sampling and monitoring programme.		Higher health hazards to public. High risk of contaminated sources. Higher maintenance cost. Less customer confidence. Loss of revenue due to less willingness to pay.	If no compliance, serious water borne diseases and community disturbance. Potential law suits and administrative crisis and extra cost. Deterioration in level of service. Sustainability of services is doubtful. Not reaching SDG 6.
Customer Satis. Indic.	14 Absence of data of service complaints per customer.	Absence of integrated customer service/follow up system. Absence of strict benchmarks for complaints response time. Absence of complaints internal quality control scheme.		Increased levels of illegal connections. Loss of confidence in service provider's system. Higher levels of vandalism to public network. Less tendency to pay bills.	Deterioration of service levels. Financial hardships to service provider. Higher levels of vandalism to network. Threat to sustainability of service provision. Not reaching SDG 6.

NOTES Based on SP's data analysis for 2019. [1] Total Operation & Maintenance (O&M) and administrative costs (excluding depreciation)/total operating revenues from water and wastewater. [2] Current assets/current Liabilities. [3] Cash and cash equivalents/current liabilities.

tainable Development Goals' was released in June 2018, prior to Palestine's presentation of its first Voluntary National Review (VNR) during the July 2018 session of the UN High-level Political Forum on Sustainable Development (HLPF).

The report highlighted the formation of a national team to coordinate

and follow up on SDG implementation, and to check on the inclusion of the SDGS in Palestine national policy agenda. When the audit was conducted, the national policy agenda did not include specific information about the financial means necessary to implement the SDGS. Nevertheless, the audit found a 'strong' SDG commitment from the Palestinian government and noted the creation of 17 working groups composed of governmental and non-governmental entities, one for each SDG. The report also highlighted the lack of communication channels between the government and civil society regarding the SDGS, and a lack of effort from the Palestinian government to raise public awareness of the Goals and disseminate necessary information; due to the absence of a national programme to communicate the Goals through different communication tools (State Audit and Administrative Control Bureau – Palestine 2018).

The continuity and sustainability of water and wastewater operations are at risk of collapse. There were no references to SDG 6 in the 'National Water Sector Strategic Plan and Action Plan' (SDP) (2017–2022) nor to the Millennium Development Goals (MDGS). Furthermore, the report on the 'Review of the Palestinian Government Preparedness for the Sustainable Development Goals' was entirely prepared in and within the context of West Bank, but no reference was made to SDGS or SDG 6 status in the GS. To bridge the gaps between the different stakeholders in the water sector concerning the achievement of SDG 6 and other SDGS, a new radical law should be created to legalize and put in mandatory perspective the sustainable development goals as a fundamental part of the strategic planning and projects design, rather than to keep it as occasional committees or temporary efforts that have no legal jurisdiction, nor the necessary tools for continuous follow up and measurement of achievement.

The efforts of local, regional, and international regulatory and standardization organizations should be integrated in a centralized global body for optimization of resources and maximization of output.

Recommendations

Based on numerical findings, data and cause effect analysis, the researchers have developed two sets of recommendations, one to improve the technical and financial dimensions in terms of the key performance indicators related to them, and a second to improve the administrative dimension and related features.

Table 4 shows the first set, which includes recommendations to im-

TABLE 4 Recommendations to Improve Technical and Financial Dimensions

	Indicator	Improving operations/performance	Improving data reporting/records
1	Average daily water sold per capita based on total population served	Modernize meter reading methods. Categorization of subscriptions. Reducing NRW. Implement meter maintenance and calibration programme.	Installing meter for every subscription. Separation of water sales per customer category. Checking customers' meters on regular basis. Update customer registers. Regular and periodic meter readings.
2	Non-Revenue Water by volume	Installing meters for all customers. Installing bulk meters for all wells and bulk sources. Design and implement an ongoing programme to eliminate illegal connections. Design and implement a continuous programme for leak detections on water network and repair. Design and implement a comprehensive public awareness and education programme to show negative effects of illegal connections, legal and ethical consequences.	Update customer meter reading registry. Make real readings and avoid as much as possible estimated readings. Continuous sampling and checking of readings. Holding accurate and updated records for public/governmental and municipal building consumptions and issue bills.
3	Average selling price per m^3 of water	Accurate categorization of customer groups to separate pricing block and increase selling price for higher consumption customers. Redesign tariff structure and increase consumption blocks.	Update customer activity/category details. Periodic check on customer details registry. Eliminate estimated meter readings.
4	Operating costs per m^3 of water sold	Install meters for all customers including public and municipal buildings. Design and implement preventive maintenance programme to reduce maintenance costs. Design and implement power optimization/conservation programme to reduce electricity/power costs. Design and implement leak detection and repair plan to reduce NRW, and cost of pumping extra quantities of water.	Creating cost canters in accountancy books. Separating cost items. Requesting services of external auditing. Implementing a computerized inventory system. Holding accurate invoices for purchased water from external sources.
5	Collection efficiency-water service	Activate legal measures against big consumers with considerable outstanding debts to service providers. Coordinate with other governmental entities to request water bill clearance from customers for different public services. Encourage/make mandatory for non-domestic customer to have pre-paid water meters. Design and implement public awareness/education programme to raise customer's willingness to pay.	Audit and review customers' invoices. Review meter reading logs. Record all customer payments and partial payments against receipts.

Continued on the next page

prove the operational/performance level of the technical and financial dimensions/aspects and improve the level of data reporting and records which are essential to measure the key performance indicators and hence level of improvement to achieve SDG 6 and its targets.

TABLE 4 *Continued from the previous page*

	Indicator	Improving operations/performance	Improving data reporting/records
6	Water samples (taken from network including mains) containing free chlorine residual (RC)	Activate an electronic platform to enable stakeholders working in water sector to record testing results they make. Link the chlorination system with Supervisory control and data acquisition (SCADA) control system to enable full monitoring & intervention 24/7. Design and implement a programme for dealing with contaminations at very short notice.	Keep accurate and computerized records of testing results and their details. Apply local and international standards in keeping testing records. Conduct periodic and comprehensive calibration for testing equipment both used in field or at laboratory. Implement real-time reporting and data recording system.
7	Service Complaints per customer – water service Service Complaints per customer – wastewater service Continuity Complaints (%) Water Quality Complaints (%) Billing Complaints and Queries (%) Other Complaints and Queries (%)	SPS should register all customer complaints & inquiries. Implement customer service/tracking system. SPS should allow computerized web-based customer interactions platform. Assign Free call numbers for call canters and emergency response. Design and implement customer/public awareness – education programme. Develop a modern customer charter to clarify contractual relationship with customer, rights and obligations of each party.	Update customer service records and data. Update customer service complaint records. Categorization of complaints & inquiries. Implement computerized and secured customer complaint/tracking system. Conduct periodic check/review on sample inquires and complaints.

References

Barbier, E. B., and J. C. Burgess. 2017. 'The Sustainable Development Goals and the Systems Approach to Sustainability.' Economics Discussion Papers 28, Kiel Institute for the World Economy, Kiel.

Berg, S. V. 2020. 'Performance Assessment Using Key Performance Indicators (KPIs) for Water Utilities: A Primer.' *Water Economics and Policy* 6 (2). https://doi.org/10.1142/S2382624X20500010.

Berg, S. V., and M. A. Phillips. 2017. 'Data Availability As a Key Tool for Regulating Government-Owned Water Utilities.' *Utilities Policy* 49 (C): 30–7.

Guppy, L., P. Mehta, and M. Qadir. 2019. 'Sustainable Development Goal 6: Two Gaps in the Race for Indicators.' *Sustainability Science* 14 (2): 501–13.

Han, S., H. Hwang, S. Kim, G. S. Baek, and J. Park. 2015. 'Sustainable Water Infrastructure Asset Management: A Gap Analysis of Customer and Service Provider Perspectives.' *Sustainability* 7 (10): 13334–50.

Hutton, G., and M. Varughese. 2016. 'The Costs of Meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene.' Working Paper, World Bank, Washington, DC.

Lo Storto, C. 2011. 'Benchmarking in the Public Service Industry: The Italian Water Service Management Sector.' In *2011 IEEE International Con-*

ference on Industrial Engineering and Engineering Management, 1145–9. Singapore: IEEE.

Marques, R. C., and A. J. Monteiro. 2001. 'Application of Performance Indicators in Water Utilities Management: A Case-Study in Portugal.' *Water Science & Technology* 44 (2–3): 95–102.

Marques, R. C., N. F. da Cruz, and J. Pires. 2015. 'Measuring the Sustainability of Urban Water Services.' *Environmental Science & Policy* 54:142–51.

Ortigara, A. R. C., M. Kay, and S. Uhlenbrook. 2018. 'A Review of the SDG 6 Synthesis Report 2018 from an Education, Training, and Research Perspective.' *Water* 10 (10): 1353. https://doi.org/10.3390/w10101353.

Palestinian Water Authority. 2016. *National Water Sector Strategic Plan and Action Plan (SDP) (2017–2022).* Ramallah: Palestinian Water Authority.

Paoli, A. D., and F. Addeo. 2019. 'Assessing SDGS: A Methodology to Measure Sustainability.' *Athens Journal of Social Sciences* 6 (3): 229–50.

Smith, C. D., K. Jackson, H. Peters, and S. H. Lima. 2020. 'Lack of Safe Drinking Water for Lake Chapala basin Communities in Mexico Inhibits Progress toward Sustainable Development Goals 3 and 6.' *International Journal of Environmental Research and Public Health* 17 (22): 8328. https://doi.org/10.3390/ijerph17228328.

State Audit and Administrative Control Bureau – Palestine. 2018. 'Review of the Palestinian Government Preparedness for the Sustainable Development Goals, Final Report.' https://sdg.iisd.org/news/palestine-audit-notes-governments-sdg-commitment-calls-for-awareness-raising/.

Waage, J., C. Yap, S. Bell, C. Levy, G. Mace, T. Pegram, E. Unterhalter, N. Dasandi, D. Hudson, R. Kock, S. Mayhew, C. Marx, and N. Poole. 2015. 'Governing the UN Sustainable Development Goals: Interactions, Infrastructures, and Institutions.' *The Lancet Global Health* 3 (5): e251–2.

Walters, J. P., and A. N. Javernick-Will. 2015. 'Long-Term Functionality of Rural Water Services in Developing Countries: A System Dynamics Approach to Understanding the Dynamic Interaction of Factors.' *Environmental Science & Technology* 49 (8): 5035–43.

Weststrate, J., G. Dijkstra, J. Eshuis, A. Gianoli, and M. Rusca. 2019. 'The Sustainable Development Goal on Water and Sanitation: Learning from the Millennium Development Goals.' *Social Indicators Research* 143 (2): 795–810.

Whittington, D., W. M. Hanemann, C. Sadoff, and M. Jeuland. 2009. 'The Challenge of Improving Water and Sanitation Services in Less Developed Countries.' *Foundations and Trends® in Microeconomics* 4 (6–7): 469–609.

World Bank. 2018. *Securing Water for Development in West Bank and Gaza.* Washington, DC: World Bank.

Interviews

Abu Altayef, Mazen. Associate Professor, Civil & Environmental Engineering Department the Islamic University of Gaza – Palestine. 23 October 2020.

Abu Ras, Ahmad. Under Secretary of Ministry of Local Government, former General Director of Gaza city Municipality. 11 October 2020.

Abu Shomar, Reem. Public Health & Environment Expert, Program Coordination Unit, Palestinian Water Authority. 08 October 2020.

Dissi, Riad. Financial and Administrative Manager at Water Sector Regulatory Council, Palestine. 04 October 2020.

El Sheikh, Rebhy. Technical Consultant, Representative of French Development Agency, former Deputy Head of PWA – Palestine. 03 October 2020.

Hamdi, Mohammad. S Hmaidi, Chief Executive Officer (CEO) at the Water Sector Regulatory Council – Palestine. 04 October 2020.

Lababidi, Hani. General Manager of Municipal Budgetary Department, Ministry of Local Government – Palestine. 11 October 2020.

Muhasien, Mutaz. Manager of Gaza office, Municipal Development and Lending Fund – Palestine. 15 October 2020.

Qahman, Khalid. Assistant Chairman at Environment Quality Authority – Palestine. 1 October 202.

The Impact of the Covid-19 Pandemic on Investor Sentiments: Evidence from 12 Selected Major Tourism-Related Companies

Helena Nemec Rudež
University of Primorska, Slovenia
helena.nemec@fts.upr.si

Received: 23 July 2021 · Accepted: 13 October 2021
Published online: 31 March 2022

To understand investor confidence and its change in tourism, which was one of the industries most affected by the pandemic, the paper presents the stock price movements of twelve major listed companies in the tourism industry in the first year after the Covid-19 pandemic outbreak. The 1-month interval of closing prices from January 1, 2020, before the pandemic was announced, to April 1, 2021, is observed to assess investor confidence. Investor confidence is compared between companies in different sectors of the tourism industry. The pandemic itself has not had a clear impact on stock prices as it has developed, showing that some of them recovered within a few months, while others have not, even a year after the outbreak of the pandemic. Based on the one-year stock price movements after the outbreak, three groups of tourism-related companies are identified.

Key Words: Covid-19 pandemic, tourism-related companies, stock price, investor confidence
JEL Classification: D53, L83, D25
 https://doi.org/10.26493/1854-6935.20.43-58

Introduction

The tourism industry is one of the largest industries in the world. Before the Covid pandemic, it generated (including its direct, indirect and induced impacts) 10.6% of global jobs, 10.4% of global GDP, 6.8% of total exports and 27.4% of global services exports (see https://wttc.org/Research/Economic-Impact). Crises affecting tourism have been studied in the past (e.g. Novelli et al. 2018; Aliperti et al. 2019; Jiang, Ritchie, and Benckendorff 2019). Tourism has faced terrorism (first intensified in Egypt in 1997, in the United States in 2001, later in Madrid in 2004 and London in 2005), natural disasters (tsunami in Asia in 2004, wildfires in Greece in 2018 and California in 2017, typhoon in Japan in 2018), global economic crises in 2008/2009 and 2011, and health crises (foot-and-mouth disease in the United Kingdom in 2001, SARS in 2002). Some crises were

global, others regional or local. They also differ in the likelihood of their occurrence and recurrence, in their permanence and in their impact on the tourism industry. While tourism is sensitive to crises, shocks related to tourist arrivals have been shown to be temporary. However, it takes time to recover from crises and tourism policy makers need to respond to crises in a timely manner (Yucel 2021).

In relation to pandemic shocks, Sigala (2020) highlights the importance of researching pandemic crises in tourism to better understand the impact of the pandemic on different stakeholders. The impact of the Ebola outbreak between 2014 and 2016 negatively affected stock prices in tourism sectors in the geographical vicinity of the outbreak (Ichev and Marinč 2018). However, 'the coronavirus pandemic is unquestionably unique and relevant to research' (Zenker and Kock 2020, 1) and has shaken investor confidence in the tourism industry worldwide due to its magnitude and the travel restrictions imposed by governments at a global level. Investor confidence is the result of the environment in which the industry operates. When investors have high confidence in the company and its future earnings, the demand for the company's stocks increases and drives the stock price up. Conversely, when investors lose confidence in the company and its future earnings, demand for the stock decreases and a large amount of stock is sold in the market, driving the price down. Baker and Wurgler (2007, 129) define consumer sentiment as 'a belief about future cash flows and investment risks that is not justified by the facts at hand' and that (p. 149) 'waves of sentiment have clearly discernible, important, and regular effects on individual companies and on the stock market as a whole.'

According to Bodie et al. (1996), there are several factors that determine a company's stock price and expected earnings, including the global economy, domestic macroeconomics, demand and supply shocks, government policies, business cycles, and industry analysis. Fears of a pandemic in early 2020 had a major impact on these factors, causing major stock market indices to fall sharply in the first half of March due to extensive selling of stocks. The Covid-19 pandemic was a shock to the global economy, and the tourism and transportation industries were hit particularly hard. Stock prices in 2020 followed a similar pattern with a sharp decline in March 2020, with the entertainment and hospitality industry performing the worst (losing more than 70% of market capitalization), along with some other industries (petroleum and petroleum services and real estate), and also with high volatility (20% on average) (Mazur, Dang,

and Vega 2021). Actual and potential losses in tourism have affected the stock prices of tourism-related companies. To find out how much individual parts of the tourism industry were affected by the pandemic, the study uses the stock prices of selected companies in tourism-related industries.

Since the pandemic is likely to continue for several years due to its magnitude, and its effects are present in daily life, this paper examines whether the industry can recover from the initial shock within one year. The heterogeneity of the tourism product across the tourism industry and the different dependence on domestic tourism, and domestic and long-distance travel in different types of the tourism industry mean that recovery takes different lengths of time in different types of the tourism industry. For example, the restaurant industry relies more heavily on locals than other sectors of the tourism industry; online travel companies where people can book their holidays and other tourism products, and the accommodation industry, rely more heavily on short-haul and long-haul travel; while cruise ships and airlines rely more heavily on long-haul travel. The hypothesis is:

> Investor sentiment, measured by stock prices, varies across tourism sectors in the first year after the Covid pandemic outbreak.

The stock price performance of twelve major companies will be used to determine how investors reacted to such an unprecedented shock in the tourism industry and whether the tourism industry can recover within one year from such an initial shock, which was later followed by several setbacks in the national and international economy and tourism.

The paper is organized as follows. In the next section a review of the literature on stock prices of tourism/related companies during the Covid-19 pandemic is presented. Then, the methods and data used are described. In the fourth section the research findings are explained. The fifth section is a discussion. In the last section, conclusions are drawn.

Pertinent Literature

Due to the uniqueness of Covid-19 crises in tourism, experience from previous crises cannot be used, including the 2008/2009 financial crisis, where a demand shock occurred, while Covid-19 pandemic crises affected both demand and supply (Plzakova and Smeral 2022). Research on tourism in Covid-19 pandemic times developed very quickly. The first research papers on Covid-19 and tourism were published after the first

months of the pandemic outbreak, followed by extensive research in the field. Due to the large scale of the pandemic, it is critical to understand investor confidence in the tourism industry and its components, which is driven by both irrational (based on emotion) and rational (based on information and facts) behaviour. Tourism investors in the US were more driven by irrational behaviour and anticipation of bad scenarios, while European investors were more influenced by rational behaviour (Reis and Pinho 2020). Separately, the tourism stock market has proven to be highly volatile due to the uncertainty surrounding the Covid-19 pandemic.

The initial research on investor sentiment towards future stock returns focused on China, where the pandemic first spread. The decline in the prices of 18 of the 21 tourism stocks traded on Chinese stock exchanges was first noted in China after the announcement of the Wuhan lockdown in January (Liew 2020b). Subsequently, a rapid decline in the stock prices of three leading online travel companies (Booking Holdings Inc., Expedia Group, Trip.com Group Ltd.) was observed from January to March 2020 (Liew 2020a). Following up on the returns in the early phase of the pandemic (through April 2020), Sharma and Nicolau (2020) found that four tourism sectors (i.e. hotels, airlines, cruise lines, and car rentals) experienced a significant decline in valuations, with the impact of the pandemic being greatest in the cruise industry, likely because business tourism, which can recover earlier, is less present in the cruise industry. Looking at the different sectors of the tourism industry separately in February and March 2020, consumer confidence was low regardless of sector (Nhamo, Dube, and Chikodzi 2020). Using more than 1,200 different tourism companies in 52 countries, Kaczmarek et al. (2021) show that the stock prices of companies with low corporate valuation ratios, limited debt and intensive investment policies, low levels of individualism in the national culture, and strong government policies and quick policy responses were more immune to the pandemic shock between January and March 2020. Similarly, Carter et al. (2022) find that cash reserves and corporate debt played an important role for investors in US travel companies in the second half of February and March 2020. Lin and Falk (2021) analyse the travel and leisure industry in three Nordic countries from June 2018 to June 2020 and find that the timing, probability, and duration of the crisis regime depend on the composition of travel and leisure companies.

Later in August 2020, investors re-entered the stock market in anticipation of a recovery after the pandemic collapse in March 2020, and as a

result, the stock prices of many companies rose to pre-pandemic levels. Herrenbrueck (2021) pointed out that the pandemic generally increased demand for savings instruments, which led to higher stock prices by August 2020, assuming that the pandemic will be short, and no deeper crisis will lead to corporate bankruptcies. Of course, stock prices are especially difficult to forecast in times as unpredictable as the pandemic. Vaccination, which began in late 2020 and 2021, has changed investor sentiment in general.

The contribution of the paper is to enhance the knowledge about the diversity of tourism sectors as an investment opportunity. The paper complements previous academic work by confirming that investor confidence in different sectors of the tourism industry varies when a crisis of unprecedented magnitude occurs, as is the case with the Covid-19 pandemic. The heterogeneity of the tourism sectors is not only a matter of consumer perspective, but also of investor perspective.

Data and Method

This paper examines the stock prices of twelve tourism-related companies for the period from January 1, 2020 to April 1, 2021 using data from the website Yahoo Finance (https://finance.yahoo.com) to determine investor sentiment changes. The companies included in the sample are the largest listed companies by market capitalization in various tourism sectors. The stock price data of the sampled companies consist of closing prices at one-month intervals. Some stocks are quoted in USD, others in EUR and GBP. The start date chosen is January 1, 2020, a date when stock prices worldwide were not yet affected by the pandemic threat.

The study focuses on the stock price performance of twelve selected major companies in the tourism industry that cover a significant market stock in the world. Although the number of companies included in the study is limited in order to provide a clear representation of each stock, the companies included in the sample cover various sectors of tourism, including the accommodation sector (Hilton Worldwide Holdings Inc., Accor SA), restaurants and cafes (McDonald's Corporation, Starbucks, Domino's Pizza), the travel sector (Booking Holdings Inc., Expedia Group, TUI AG), the airline sector (EasyJet, Wizzair), and the cruise market (Carnival, Royal Caribbean). The leading sharing economy company (Airbnb) is not included in the analysis as it did not go public until December 2020. For the stocks included in the sample, the minimum and maximum stock price is searched for the given time pe-

riod and the standard deviation, skewness, kurtosis and Jarque-Bera test are calculated. The stock price during the selected period is presented in charts rather than tables for simplicity, to illustrate the price movements that express investor sentiment towards the companies in the sample.

Findings

The stock prices of the tourism-related companies in the sample show an obvious pattern in stock price changes that reflects a negative impact on stock prices. The 15-month period shows how investors react after the initial price decline. The most obvious is a huge decline in stock prices in March 2020, which has already been confirmed in several recent studies. Stock prices have been very volatile, showing the great uncertainty in tourism and the unpredictable environment and future returns. Fears of a pandemic were already present in February and early March before WHO made the assessment that Covid-19 could be characterized as a pandemic on March 11, 2020. The drop in stock prices at that time could be also a result of other events, such as the 2020 U.S. election year or the oil price war that began on March 8, 2020, and not the emerging fear of a pandemic. Later, the outbreak of the pandemic had an important impact on investor sentiment in the tourism-related industry.

The lowest stock prices were recorded in March 2020 immediately after the pandemic outbreak was announced, or in early April (see table 1). The cruise market was the hardest hit. Most companies did not recover by early April 2021 and some of them reached the lowest investor confidence later in May 2020 (TUI AG, Accor) or October 2020 (EasyJet). The standard deviation is very high for some stocks, which is due to the high volatility during the Covid pandemic, already confirmed by Acharya, Liu, and Zhao (2021). Thus, investor sentiment varied widely across tourism sectors, suggesting that the perception of pandemic risk varies across tourism stocks.

Skewness and kurtosis are used to perform the Jarque-Bera test, which tests whether stock prices are normally distributed or not (table 1). The Jarque-Bera test shows that the stock prices in the sample are not normally distributed, with the exception of TUI AG, Domino's Pizza and Royal Caribbean Group. This is consistent with the study of Chaudhary, Bakhshi, and Gupta (2020) that stock price returns are not normally distributed after the Covid pandemic.

After the shock in March, the stock prices of some companies (McDonald's, Domino's Pizza, Starbucks, Hilton, Booking, Expedia) recovered in

TABLE 1 Minimum and Maximum Closing Price of Tourism-Related Companies in the Sample between 1 January 2020 and 1 April 2021

Company	(1)	(2)	(3)	(4)	(5)	(6)
Booking Holdings Inc.	1,152.24 USD (23/3/2020)	2,461.78 USD (17/3/2021)	324.98	0.389	−0.955	10.830 (0.004)
Expedia Group Inc.	45.65 USD (18/3/2020)	185.27 USD (17/3/2021)	35.57	0.625	−0.556	9.25 (0.009)
TUI AG	1.81 EUR (14/5/2020)	11.62 EUR (2/1/2020)	0.999	0.399	−1.298	1.195 (0.550)
McDonald's Corporation	137.1 USD (23/3/2020)	229.64 USD (15/10/2020)	17.510	−0.670	−0.014	7.227 (0.027)
Starbucks	56.55 USD (23/3/2020)	111.34 USD (16/3/2021)	15.209	0.302	−1.219	12.114 (0.002)
Domino's Pizza Inc.	270.08 USD (3/2/2020)	431.05 USD (7/10/2020)	36.528	−0.822	1.265	3.809 (0.149)
Wizz Air Holdings plc.	2,206.00 GBP (19/3/2020)	5,565.00 GBP (11/3/2021)	852.54	0.084	−0.978	10.569 (0.005)
EasyJet plc.	470.7 GBP (16/10/2020)	1,552.0 GBP (11/2/2020)	252.475	0.966	0.685	6.061 (0.048)
Accor SA	20.72 EUR (14/5/2020)	41.76 EUR (2/1/2020)	4.707	0.412	−0.865	10.447 (0.005)
Hilton Worldwide Holdings Inc.	55.94 USD (3/4/2020)	127.26 USD (24/2/2021)	18.8	0.232	−1.223	12.035 (0.002)
Carnival Corporation plc.	7.97 USD (2/4/2020)	51.31 USD (2/1/2020)	8.434	1.472	2.018	6.426 (0.040)
Royal Caribbean Group	22.33 USD (22/3/2020)	135.05 USD (17/1/2020)	21.248	0.472	0.400	5.099 (0.078)

NOTES Column headings are as follows: (1) minimum stock price, (2) maximum stock price, (3) standard deviation, (4) skewness, (5) kurtosis, (6) Jarque-Bera test (p-value). Based on data from Yahoo Finance (https://finance.yahoo.com).

the coming months. On the other hand, investor confidence remained low in Accor, TUI, EasyJet and the cruise companies until November 2020. After the effective Covid-19 vaccine was announced on November 9, 2020, and hopes of an end to the pandemic increased, investor confidence in these stocks also increased slightly.

In 2021, tourism stock prices continued to be hurt by the sluggish vaccination programme in the first quarter. Some stock prices were also affected by the suspension of dividends due to government financial support conditions or corporate decisions. Although the changes in stock

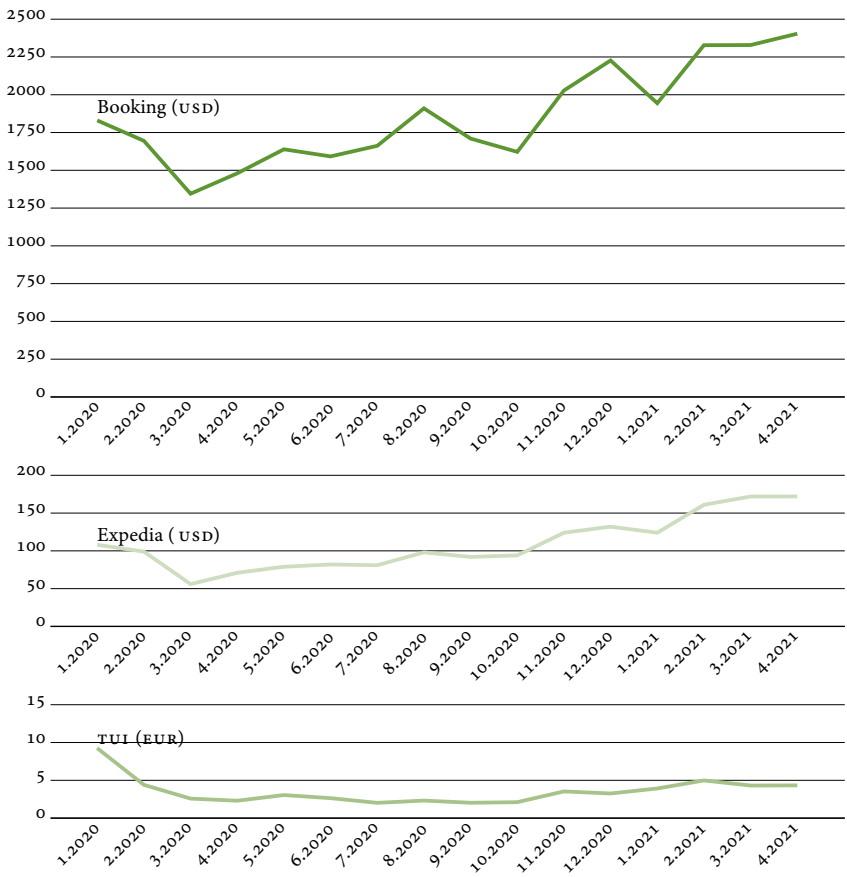

FIGURE 1 Stock Price Movement of Travel Companies (Booking Holdings Inc., Expedia Group Inc., and TUI AG) between 1 January 2020 and 1 April 2021 in 1-Month Interval (based on data from Yahoo Finance, https://finance.yahoo.com)

prices in March 2020 showed a similar pattern of stock price decline, 7 of the 12 companies in the sample reached a higher stock price level in early April 2021 than in January 2020, showing investor confidence in tourism. All stocks recovered significantly from the March 2020 shock, with the second wave of the pandemic in the second half of 2020, with new travel restrictions, delaying the recovery of stock prices in general. In November 2020, the stock market recovered after news of the Covid-19 vaccine approval on November 9, 2020.

Figure 1 shows the stock price fluctuations of travel-related companies. Close competitors Expedia and Booking both saw positive investor senti-

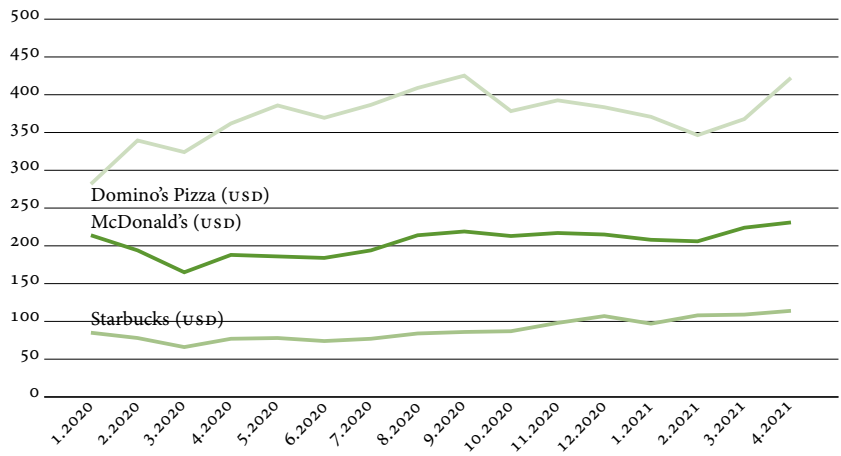

FIGURE 2 Stock Price Movement of Restaurant Sector (McDonald's Corporation, Starbucks Corporation, and Domino's Pizza Inc.) between 1 January 2020 and 1 April 2021 in 1-Month Interval (based on data from Yahoo Finance, https://finance.yahoo.com)

ment in the first quarter of 2021, even though it was not yet clear when the pandemic would end. The reason is likely the fact that consumers can buy tourism products in faraway destinations and accommodations in destinations closer to home. Although travel companies are doing well one year after the start of the pandemic, TUI's stock price is still low due to the large losses from the pandemic and probably due to the large amount of debt. Thus, the stock price of TUI AG also reflects other financial issues of the company, which do not allow the stock price to recover. The least affected by the pandemic is the restaurant industry. In fact, the stock prices of fast food restaurants, cafes and pizza chains recovered immediately after the pandemic shock in March 2020 (see figure 2), which proves that the restaurant and café industry is generally dependent on the local population, including takeaways, and is independent of the tourism industry in many cities.

The comparison between the hotel companies Accor and Hilton (figure 4) and between the low-cost airlines Wizz Air and EasyJet (figure 3) shows that investor confidence in the same industry differs between companies.

The airline and hotel industries have struggled with a sharp decline in guests or passengers and uncertainty still persists; while Wizz Air and Hilton have regained investor confidence a year after the pandemic began, EasyJet and Accor have not, likely due to different corporate issues. This suggests that the pandemic itself does not have a clear impact on

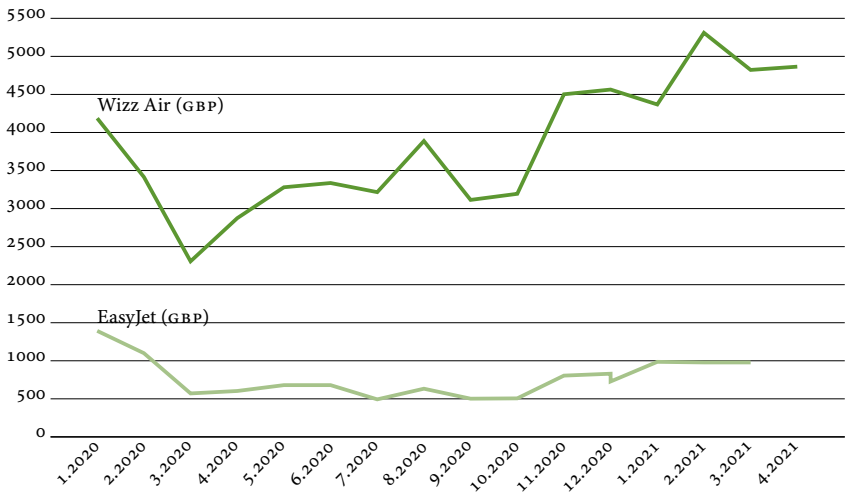

FIGURE 3 Stock Price Movement of Air Transport Industry Companies (Wizz Air plc and EasyJet plc) between 1 January 2020 and 1 April 2021 in 1-Month Interval (based on data from Yahoo Finance, https://finance.yahoo.com)

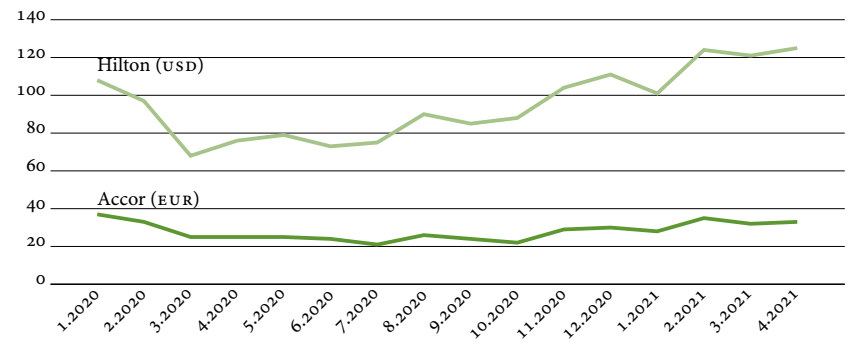

FIGURE 4 Stock Price Movement of Accommodation Sector (Accor SA and Hilton Worldwide Holdings) between 1 January 2020 and 1 April 2021 in 1-Month Interval (based on data from Yahoo Finance, https://finance.yahoo.com)

stock price in 2021. Other company-related characteristics probably play an equally important role.

Cruise lines were one of the sectors most affected by the Covid-19 pandemic (see figure 5). The stock price has not yet recovered to pre-Covid-19 epidemic levels as of April 1, 2021. Royal Caribbean and Carnival (which also owns accommodation businesses) posted large net losses in 2020 due to a sharp decline in revenues. This is likely due in part to the fact that one of the first outbreaks of the Covid-19 pandemic was reported on the

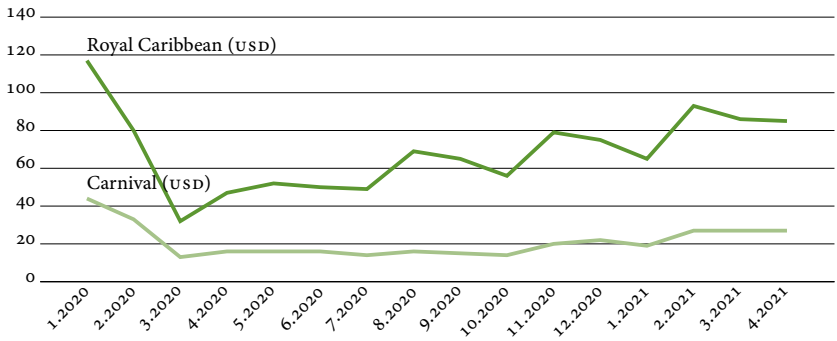

FIGURE 5 Stock Price Movement of Cruise Industry (Royal Caribbean Group, and Carnival Corporation & plc) between 1 January 2020 and 1 April 2021 in 1-Month Interval (based on data from Yahoo Finance, https://finance.yahoo.com)

cruise ship Diamond Princess in February 2020, and authorities isolated passengers on board for 14 days, leading to some criticism. Several other cruise ships subsequently reported pandemic outbreaks on board among crew and passengers. Moreover, cruise ships rely on leisure tourism rather than business tourism as already pointed out by Sharma and Nicolau (2020).

Stock price movements in tourism-related companies confirm findings of Reis and Pinto (2020) that the Covid-19 pandemic has caused fear and panic among economies and accumulated losses due to low demand, but also created opportunities for stock price recoveries. One year after the pandemic outbreak the investor fear has still not (completely) disappeared. While half of the companies in the sample have reached the pre-pandemic stock price by April, 2021, the other half of companies is still faced with lower investor confidence.

Discussion

The wide range of businesses involved in tourism were hit hard by the pandemic, as reflected in travel restrictions, border closures, and debt burdens during the first year of the Covid-19 pandemic. Although stock prices are the result of many different factors affecting the market environment, the huge decline in the stock prices of listed companies in the tourism industry immediately after the outbreak of the pandemic confirms that the stock prices were primarily affected by the pandemic. The investor shock and its aftermath in the first year after the pandemic outbreak showed high standard deviation for several tourism-related com-

panies described in the study. However, governments' financial interventions likely mitigated the negative impact on stock prices.

Given that some stock prices were at higher levels on April 1, 2021 than they were at the beginning of 2020, it is reasonable to assume that they have recovered from the news of the pandemic outbreak and the ongoing travel restrictions, and that the pandemic in general has not had a long negative impact on investor sentiment, suggesting that a positive outlook prevails in the industry. The positive outlook for the travel industry can be inferred from investor confidence in travel companies such as Expedia and Booking. In contrast, investor confidence in cruise companies appears to have been low in the first year of the pandemic, likely due to their reliance on leisure tourism. Similar to previous studies on the impact of the Covid pandemic on stock prices (Acharya, Liu, and Zhao 2021; Chaudhary, Bakhshi, and Gupta 2020), high standard deviations of stock prices and non-normally distributed stock returns were found.

Although stock prices were hardly affected by low investor confidence immediately after the outbreak of the pandemic, the prices of different companies moved in different directions after some time, showing that investor confidence in the tourism industry was regained differently across the industry. Based on the sample of twelve companies for which the stock price performance is evaluated in the first year after the Covid-19 pandemic, the companies could be classified into three groups.

- Group A includes the restaurant and café sector (McDonalds, Domino's Pizza, Starbucks), whose stock prices recovered within a few months of the outbreak of the pandemic and reached the stock price level of early 2020 in September 2020. This is likely due to restaurants relying less on tourists and more on locals and food deliveries.
- Group B includes four companies whose stock price recovered within a year of the March 2020 decline. Stock prices of Booking, Expedia, and Wizz Air clearly recovered by November, while Hilton's stock price took a year.
- Group C is the largest and includes five out of twelve companies in the sample whose stock price did not recover to pre-pandemic levels by April 2021, likely due to ongoing financial issues and/or continued travel restrictions and travel anxiety. These include companies from various sectors of tourism, TUI AG, EasyJet, Accor, Carnival, and Royal Caribbean.

The hypothesis proposed is confirmed. Investor sentiment varied

across tourism sectors in the first year following the outbreak of the Covid pandemic. Restaurant businesses recovered more quickly from the pandemic shock than other tourism sectors because they had previously relied on locals to deliver takeaway food. Online travel companies (Booking, Expedia) also recovered by the end of 2020, likely due to the variety of products they sell and travel closer to home. In the lodging sector, the stock prices of two major companies are examined. Investor confidence in Hilton has increased to pre-pandemic levels by the end of 2020, but Accor's stock price has not. There is a difference also in the airline sector, showing that Wizz Air was able to regain investor confidence to the pre-pandemic level by the end of 2020 while EasyJet had not. The difference is probably due to the different company characteristics in this sector. While online travel companies (Booking, Expedia) recovered by the end of 2020, the stock price of tourism company TUI AG remained lower as online travel planning obviously gains more confidence in the market. As for the cruise companies, investor confidence in Carnival and Royal Caribbean had not yet returned to pre-pandemic levels a year after the outbreak, likely due to the long-haul travel associated with cruises. Thus, pandemic shocks have different impacts on different parts of the tourism industry.

In terms of practical implications, we should bear in mind that, on the one hand, the tourism industry is very sensitive to the health crisis, but, on the other hand, the tourism industry is expected to recover because people are willing to travel. Therefore, tourism investors can limit their risk by hedging their investments in the tourism industry and diversifying risk by investing in gold, bonds, real estate, and stocks of less crisis-prone industries (basic materials and pharmaceuticals). Indeed, the growth of tourism in the past has shown that investment in tourism can bring competitive returns and therefore needs to be included in investment portfolios.

Conclusion

The recovery in the stock prices of various companies in 2021 shows that investor confidence in the tourism market and tourism-related companies has increased, despite the still-present pandemic. After the initial shock and panic in the stock market, investors reacted more rationally in the following months, leading to a rebound in the stock prices of some tourism-related companies. The stock prices over the period of 15 months show that the decline in stock prices of some tourism-related companies

was temporary and has already returned to the previous level in April 2021, while investors are still cautious about some tourism-related companies and are probably waiting for the travel restrictions to be lifted. As pointed out by Mishra and Mishra (2020), tourism-related activities and profitability opportunities for businesses will improve investor sentiment towards tourism investment and allow for more stable tourism growth. Possible future pandemic outbreaks are likely to cause further price volatility, although the market may have become accustomed to the circumstances, similar to the terrorist attacks of recent decades. Nevertheless, new research examining investor reactions and sentiment to the consequences of a pandemic over an extended period of time would be welcome. In the second and third quarters of 2021, there is still uncertainty about the pandemic, particularly about the spread of the various Covid-19 variants. A possible expansion of the Covid-19 pandemic or a new pandemic in the future should not be such a big shock to the tourism industry, as people usually get used to a changed environment, as has been the case with the terrorism threat in recent decades.

The paper has several limitations. The first limitation is that the stock price movements do not take into account other firm characteristics, but only the pandemic issue, to which everything else was subordinated in the first year after the outbreak of the pandemic. The next limitation of the study is that it is limited to twelve large firms in the tourism industry, even though they have a large market stock in their sector. Less stringent travel restrictions and vaccination procedures should improve investor sentiment towards tourism. Therefore, it is recommended that further research on investor confidence be conducted in the future, including more companies. The stock price movements of large companies in the tourism industry reveal relevant and important information and provide lessons for investors and management to be better prepared for similar future crises. Another limitation of this study is that it focuses on large listed companies and does not reveal the sentiment of owners of smaller companies in the tourism sector.

References

Acharya, V. V., Y. Liu, and Y. Zhao. 2021. 'COVID-19 Containment Measures and Expected Stock Volatility: High-Frequency Evidence from Selected Advanced Economies.' IMF Working Paper 157, International Monetary Fund, Washington, DC.

Aliperti, G., S. Sandholz, M. Hagenlocher, F. Rizzi, M. Frey, and M. Garscha-

gen. 2019. 'Tourism, Crisis, Disaster: An Interdisciplinary Approach.' *Annals of Tourism Research* 79 (C): 102808. https://doi.org/10.1016/j.annals.2019.102808.

Baker, M., and J. Wurgler. 2007. 'Investor Sentiment in the Stock Market.' *Journal of Economic Perspectives* 21 (2): 129–52.

Bodie, Z., A. Kane, and A. J. Marcus. 1996. *Investments.* Chicago: Irwin.

Carter, D., S. Mazumder, B. Simkins, and E. Sinseros. 2022. 'The Stock Price Reaction of the COVID-19 Pandemic on the Airline, Hotel, and Tourism Industries.' *Finance Research Letters* 44:192047. http://doi.org/10.1016/j.frl.2021.102047.

Chaudhary, R., P. Bakhshi, and H. Gupta. 2020. 'The Performance of the Indian Stock Market during COVID-19.' *Investment Management and Financial Innovations* 17 (3): 133–47.

Herrenbrueck, L. 2021. 'Why a Pandemic Recession Boosts Asset Prices.' *Journal of Mathematical Economics* 93 (C): 102491. https://doi.org/10.1016/j.jmateco.2021.102491.

Ichev, R., and M. Marinč. 2018. 'Stock Prices and Geographic Proximity of Information: Evidence from the Ebola Outbreak.' *International Review of Financial Analysis* 56 (C): 153–66.

Jiang, Y., B. W. Ritchie, and P. Benckendorff. 2019. 'Bibliometric Visualisation: An Application in Tourism Crisis and Disaster Management Research.' *Current Issues in Tourism* 22 (16): 1925–57.

Kaczmarek, T., K. Perez, E. Demir, and A. Zaremba. 2021. 'How to Survive a Pandemic: The Corporate Resiliency of Travel and Leisure Companies to the COVID-19 Outbreak.' *Tourism Management* 84: 104281. https://doi.org/10.1016/j.tourman.2020.104281.

Liew, V. K.-S. 2020a. 'The Effect of Novel Coronavirus Pandemic on Tourism Share Prices Venus.' *Journal of Tourism Futures.* Published ahead of print, 17 August. https://doi.org/10.1108/JTF-03-2020-0045.

———. 2020b. 'Abnormal Returns on Tourism Shares in The Chinese Share Exchanges Amid The COVID-19 Pandemic.' *International Journal of Economics and Management* 14 (2): 247–62.

Lin, X., and M. T. Falk. 2021. 'Nordic Stock Market Performance of the Travel and Leisure Industry during the First Wave of Covid-19 Pandemic.' *Tourism Economics.* Published ahead of print, 3 February. https://doi.org/10.1177/1354816621990937.

Mazur, M., M. Dang, and M. Vega. 2021. 'COVID-19 and the March 2020 Stock Market Crash Evidence.' *Finance Research Letters* 38 (101690). https://doi.org/10.1016/j.frl.2020.101690.

Mishra, P. K., and S. K. Mishra. 2020. 'Corona Pandemic and Stock Market Behaviour: Empirical Insights from Selected Asian Countries.' *Millennial Asia* 11 (3): 341–65.

Nhamo G., K. Dube, and D. Chikodzi. 2020. 'COVID-19 and the Stock Market: Impacts on Tourism-Related Companies.' In *Counting the Cost of COVID-19 on the Global Tourism Industry,* 297–318. Cham: Springer. https://doi.org/10.1007/978-3-030-56231-1_13

Novelli, M., L. Gussing-Burgess, A. Jones, and B. W. Ritchie. 2018. '"No Ebola … still doomed" – The Ebola-induced Tourism Crisis.' *Annals of Tourism Research* 70:76–87.

Plzakova, L., and E. Smeral. 2022. 'Impact of the COVID-19 Crisis on European Tourism.' *Tourism Economics* 28 (1): 91–109.

Reis, P. M. N., C. and Pinho. 2020. 'COVID-19 and Investor Sentiment Influence on the US and European Countries Sector Returns.' *Investment Management and Financial Innovations* 17 (3): 373–86.

Sharma, A., and J. L. Nicolau. 2020. 'An Open Market Valuation of the Effects of COVID-19 on the Travel and Tourism Industry.' *Annals of Tourism Research* 83: 102990. https://www.doi.org/10.1016/j.annals.2020.102990

Sigala, M. 2020. 'Tourism and COVID-19: Impacts and Implications for Advancing and Resetting Industry and Research.' *Journal of Business Research* 117:312–21.

Yucel, A. G. 2021. 'Are Shocks to Tourist Arrivals Permanent or Transitory? A Comprehensive Analysis on the Top 20 Most-Visited Countries.' *Current Issues in Tourism* 24 (16): 2294–311.

Zenker, S.and F. Kock. 2020. 'The Coronavirus Pandemic: A Critical Discussion of a Tourism Research Agenda.' *Tourism Management* 81:104164. https://doi.org/10.1016/j.tourman.2020.104164.

Global Value Chains and Economic Upgrading in Developing Countries

Kore Marc Guei
North West University, Mafikeng Campus, South Africa
marcgueik@gmail.com

Ireen Choga
North West University, Mafikeng Campus, South Africa
ireen.choga@nwu.ac.za

The emergence of global value chains (GVCs) has allowed countries to specialise in the production of specific inputs (intermediate goods and final goods), which has a direct implication for productivity. This paper explores the impact of GVCs on the economic upgrading of developing economies. Specifically, our analysis relates to the effect of foreign value added in gross exports (GVCs) on domestic value-added content of gross exports (economic upgrading), which includes the added value that emanates from all the industries of the exporting country to their trading partners. The sample covers 50 countries (22 developing and 28 advanced countries) over the period 2005–2015. We employ both a pooled OLS and a system GMM method. We contribute to the literature by differentiating between trade flows from developing economies (South-South) and developed economies (South-North). The results indicate a positive effect between GVCs participation and economic upgrading, with the effect being stronger in the case of South-North integration. Further, the results support the view that infrastructure development can play a key role in supporting the economic development of developing economies. GDP per capita, innovation, and institutional quality can all promote economic upgrading even though their effects vary across trade flows.

Key Words: exports, upgrading, global value chains
JEL Classification: F00, F10, F13

https://doi.org/10.26493/1854-6935.20.59-78

Received: 11 September 2021 · Accepted: 2 November 2021
Published online: 31 March 2022

Introduction

There has been a drastic change in global trade over the last two decades. Emerging economies are gradually increasing their share in the international trading market, which has sparked policy and academic interest regarding the integration of countries from the south. It has also triggered a debate on the economic growth repercussions for less developed

economies (Kaplinsky and Farooki 2009; Amighini and Sanfilippo 2014).

The network trade that involves countries in the south increased continuously from 40% around the mid-1990s to 50% in the last decade (2010). The production network has gained maturity in East Asia with China emerging as the Asian hub for global value chains (GVCS) (UNCTAD 2015). This trend supports the idea that lifting trade barriers can help developing countries to maximise the gains from trade liberalisation. However, the traditional approach to trade analysis that considers horizontal and vertical trade tends to overestimate South-South trade because of the risk of overstating the growth due to the difference between the trade volumes and the value added in the trade flow. Emerging and developing economies can now participate much more effectively in the global supply chains instead of starting an entire chain in their domestic market.

There seems to be a consensus in the literature that developing countries can acquire knowledge through capital inflows and external flow of trade. This leads to a rapid accumulation of technology and higher productivity level (Schiff and Wang 2006). This occurs because international trade provides another incentive for domestic firms to enhance their production efficiency in order to remain competitive. Foreign direct investment (FDI) is also an important driver for the transfer of technology. Further, the advanced technology and high level of management capabilities foreign companies bring into developing countries may produce knowledge spill over, which can in turn result in export upgrading (Narula and Driffield 2012).

The work of Greenaway and Milner (1990) shows that although the external trade flow may be beneficial to developing countries, South-South trade flows would provide more gains than the South-North ones. The literature also suggests that partner countries are an important element regarding knowledge transfer through the use of imported goods (Mlachila and Takebe 2011; Amighini and Sanfilippo 2014).

However, what is still under investigation in the literature is the extent to which GVCS enhance productivity in developing countries. Developing countries stand to gain a lot from diversifying the production process. Countries with more diversified exports tend to be more resilient and grow faster by adding value at the higher end of their exports goods while creating employment (Amiti and Freud 2010).

A concern for developing countries that become integrated into GVCS is that such countries become trapped in low value-added segments of the

GVC, where there is little possibility for innovation or technology transfer. There is also the fear that the global companies may pull out of developing countries in times of economic slowdown. It is imperative to understand the effects of GVC participation given the rise in multinational corporations and the globally traded intermediates. Therefore, the study attempts to investigate the effects of GVCS in developing countries.

The key question the study aims to address is whether the foreign value acquired through value chain participation adds value in gross exports. To the best of our knowledge, no studies have investigated the effects of GVCS on economic upgrading in developing countries by distinguishing the flow of trade. Previous studies on the subject (Görg and Strobl 2001) have focused only on productivity spill over without considering the added value in the production network. Others have focused on the role of foreign direct investment in raising the quality of exports using data at the four-digit Standard International Trade Classification (SITC) level (Harding and Javorcik 2012).

This study complements the existing literature by focusing on the effects of GVC participation on economic upgrading in developing countries. Specifically, we assess how economic upgrading in developing countries is influenced by participation in the value chains and the level of economic development of the trading partners. We provide an answer to this question by using data from 50 countries, which we classify into two groups (emerging and advanced economies) following the fiscal monitor database (https://www.imf.org/en/Publications/FM). Within this literature, exports quality has also been used to measure exports upgrading (Amighini and Sanfilippo 2014; Ndubuisi and Solomon 2020). The challenge, however, with this indicator is that it uses exports values which are sometimes limited in terms of developing country coverage.

The rest of the paper is organised as follows: the second section discusses the literature on GVC participation and economic upgrading. The third section describes the model and shows the data sources used in the empirical analysis. The fourth section discusses the results. The fifth section concludes.

Literature Review

ECONOMIC UPGRADING AND GVCS

The economic channels through which trade improves output growth is well documented. This occurs through a more efficient resource allocation between countries, which eventually raises growth.

The new trade theory which has been developed by Grossman and Helpman (1991) has emphasised the dynamics gain from trade where foreign direct investment, new knowledge and technology can alter trade patterns and support economic growth. The new trade theory paved the way for the New Economic Geography, which stresses the unequal distribution of economic activity because firms produce intermediate and final products using diverse intermediate inputs and labour.

The GVCS and economic upgrading nexus has been discussed in the literature at both the macro and micro level. The seminal work of Bernard and Jensen (1995) has questioned the idea that exporters can outperform non-exporter firms that operate in the same sector in terms of economic upgrading. Melitz (2003) shows that GVCS can boost economic upgrading when the allocation of resources is shifted from less productive firms to more productive ones.

Further, other researchers have investigated whether learning by doing, knowledge spill over, and cost of production are necessary to make firms more productive.

Firms attempt to get around trade barriers by changing their production patterns through economic upgrading. It is referred to as capturing more value by enhancing the production process or moving into higher value in GVCS (Gereffi 2019). In the literature, authors have used several indicators (output per worker, domestic value added embodied in a country's exports, sophistication of export bundles, diversification of exported products) as a proxy for economic upgrading (Taglioni and Winkler 2016). The term 'upgrading' has been referred to in the literature as industrial or economic upgrading. Cattaneo et al. (2013) associate economic upgrading with rising benefits from different stages of production along the value chains.

Nevertheless, GVCS can be a barrier to learning for local firms, by only allowing few firms to have access to technology dissemination (UNESCAP 2015). In that instance, firms will be locked into low value-added activities. Shepherd (2015) documents that the participation of GVCS in developing countries can support economic upgrading if several factors such as the policy environment, the economic structure and, more importantly, the domestic institution (rule of law) are stable.

EMPIRICAL LITERATURE

The economic growth observed in recent years has revealed the importance of GVCS participation by developing countries. The work of Ro-

drik (2006) shows that countries that embark on the promotion of quality exports tend to grow faster. Hausmann, Hwang, and Rodrik (2007) also find that economic growth occurs when resources are transferred from low productivity activities to high productivity ones. They argue that entrepreneurship that promotes the exports of sophisticated products is vital for GDP growth.

The exports of higher quality goods are less exposed to international price competition from low-cost producers. This in turn contributes to improving the balance of payment and output which is necessary for a country's sustainable development and prosperity.

Akayleh (2014) also stresses the importance of trade liberalisation policies on GDP growth in developing economies. Amiti and Freund (2010) document that one of the key reasons behind China's economic success was its ability to radically transform its export structure over the last two decades. The country experienced a reduction in the share of soft manufacture and agriculture goods while the share of hard manufacture and electronic appliances increased. Hence it has been argued in the literature that it is not the quantity of goods a country can export that matter, but the quality.

The challenge, however, is that not all firms can produce quality exports because of the lack of the required intermediate inputs. China has overcome this boundary using the activity of assembling intermediate inputs to boost its export growth.

The literature has shown that imports from the North add more to local knowledge, technology, and the export upgrading of developing economies than imports from the South. Early empirical work on the diffusion of technology has shown that bilateral trade with advanced countries leads to high spill overs (Schiff and Wang 2006).

Many researchers have also investigated the effects of FDI participation on economic upgrading. Early results on the subject have found positive spill overs (Görg and Strobl 2001) while the findings of other scholars show evidence of ambiguous effects (Lipsey and Sjöholm 2005). Paus and Gallagher (2008) suggest that econometric analyses based on cross-sectional data find positive spill overs whereas the analyses based on panel data show negative spill overs. Harding and Javorcik (2012) find a positive association between FDI and exports value in developing countries using the priority sector for attracting investment.

Hausmann, Hwang, and Rodrik (2007) show that increasing backward participation (higher share of foreign value added in exports), with ris-

ing per capita GDP, is positively related with the exports of sophisticated products.

Amador and Cabral (2015) suggest that technology is a key driver of GVCS. They show that only technological advances allow components from different parts of the world to produce sophisticated final products. Communication and transportation are also important elements for managing and maintaining complex value chains.

Similarly, Kowalski et al. (2015) studied the relation between GVCS and economic upgrading using domestic and foreign value added in imported inputs. Their results show that foreign value added contributes to increasing per capita domestic value added in exports. Further, they found different paths between value chains and economic upgrading across income groups. The gains in economic upgrading from high income countries are driven by sophisticated primary and non-primary intermediates. The gains in economic upgrading have been attributed to the flow of FDI and the sophistication of non-primary intermediates in middle and low-income economies, respectively. They conclude that GVCS in countries are impacted by the level of development and economic specialisation.

Several studies have examined the factors that influence export upgrading. In sum, these studies have agreed that a country's ability to upgrade its export is determined by investment in research and development (R&D), foreign direct investment (FDI), institutional quality, transfer of technology, and ease of credit (Zhu and Fu 2013; Crino and Ogliari 2017; Xu and Mao 2018).

Zhu and Fu (2013) examined the determinants of exports upgrading in low, middle- and high- income countries. They acknowledge the limitations of export sophistication to capture exports upgrading. The findings suggest that R&D intensity, institutional law, FDI, and human capital contribute to economic growth. The effects of human capital (proxied as the number of university students per 100,000 inhabitants) is only positive in the case of low-income economies.

Using firm-level data, Xu and Mao (2018) show evidence that exports quality in manufacturing firms in China is improved through the imports of exports of intermediate inputs.

While these papers contribute to the literature by providing important channels through which exports upgrading can be improved, none of them have examined the impact of value chains in the context of South-South and South-North trade. Also, most of the studies have used exports sophistication or exports quality, which is computed at the disag-

gregate level and therefore does not allow comparison at the macroeconomic level. Third, we also include standard measure of GVCS (backward participation) to better capture the effects of value chains in developing countries.

The measurement of GVCS participation needs to be documented as well as other factors that influence exports upgrading to fill the gap in the literature.

In the next section, the underlying argument that GVCS participation allows firms in developing countries to focus on their niche products and raise exports upgrading is assessed within an empirical framework.

Data and Model Specification

This section shows how we calculate our main indicators (GVC participation) and export upgrading. With the rapid rise of GVCS, the effects of exports have become less noticeable as they occur not only in the exporting industries or countries but also in other industries that provide intermediates, a theory that traces back to the time of at least Hirschman (1958).

We capture economic upgrading by using domestic value added in gross exports. This indicator has been used in the literature (see Kummritz, Taglioni, and Winkler 2017).

Our measure of GVC participation is the foreign value added that is embodied in domestic final demand. This is sometimes referred to as 'backward participation.' It is the foreign value added that is embodied in domestic final demand. This indicator has been used in the literature (see Ndubuisi and Solomon 2020). It is adequate for examining the effects of countries that are in the downstream activities of the supply chains. In other words, it can capture the benefits of GVC participation for countries that are involved in assembly activities based on imported components.

Countries participate in the value as either buyers (backward participation) or sellers (forward participation). Because we are interested in the channel through which foreign value affects economic upgrading, we only examine the independent effects of backward participation. We follow the literature (Kummritz, Taglioni, and Winkler 2017; Wang, Wan, and Wang 2019) to estimate the participation of GVCS. The extant literature also includes the role of institutional indicators such as rule of law, which can be an obstacle for export upgrading (see Rodrik 2008).

We estimate the determinants of economic upgrading based on the following model:

$$\text{DVA}_{i,t} = \beta_0 + \beta_1 \text{GVC}_{i,t} + \beta_2 X_{i,t} + \varepsilon_t, \quad (1)$$

where DVA stands for domestic value added and captures economic upgrading. It measures the benefit obtained along the different stages of production. *X* represents a vector of country-specific time characteristics such as GDP per capita, innovation, foreign direct investment, inflation, institutional quality, and infrastructure.

The innovation variable is captured by spending on research and development. Institutional quality is obtained from the worldwide governance indicators. A country's infrastructure level is obtained from the World Economic Forum (tcdata360). We control for the infrastructure level using the logarithm of road network. GDP per capita is taken from the Federal Reserve Bank of St Louis. The inclusion of these control variables is well documented in the literature (see Harding and Javorcik 2012; Kummritz, Taglioni, and Winkler 2017; Ndubuisi and Solomon 2020, for a detailed review).

We then use the log function of equation (1) and obtain:

$$\begin{aligned} \ln \text{DVA}_{i,t} = {} & \beta_0 + \beta_1 \ln \text{GVC}_{i,t} + \beta_2 \ln \text{GDP}_{i,t} + \beta_3 \text{innovation}_{i,t} \\ & + \beta_4 \ln \text{FDI}_{i,t} + \beta_5 \text{inflation}_{i,t} + \beta_6 \ln \text{institutional quality}_{i,t} \\ & + \beta_7 \ln \text{infrastructure}_{i,t} + \varepsilon_t. \end{aligned} \quad (2)$$

It is important to note that all the data are in current prices except innovation, which is expressed as a percentage of GDP, and inflation, which reflects the annual percentage change in the cost of the average consumer spending.

Harding and Javorcik (2012) have incorporated several control variables which influence export sophistication such as inflation and GDP per capita. Although we argue that GVC participation can increase exports upgrading, it is crucial to examine its effects in the context of developing countries. The next section discusses the methodology and the results. We use the OECD ICIO database for the period 2005–2015 for the GVC and economic upgrading indicator. This database allows us to cover the effects of GVCS in the full sample of countries. We split countries from the sample based on the level of economic development. Thus, we have countries from the South (emerging and developing countries) and countries from the North (EU countries) (table 1). The developing countries selected are mostly from the East Asian region because of their increasing role in GVCS (UNCTAD 2019). Table 2 presents the summary statistics of the variables used in the study.

TABLE 1 Countries Considered in the Sample

Developing economies		Advanced economies	
Argentina	Kazakhstan	Austria	Lithuania
Brazil	Malaysia	Belgium	Luxembourg
Brunei	Morocco	Cyprus	Malta
Bulgaria	Peru	Czech Republic	Netherlands
Cambodia	Philippines	Denmark	Poland
China	Russia	Estonia	Portugal
Costa Rica	Saudi Arabia	Finland	Romania
Croatia	South Africa	France	Slovakia
Hong Kong	Thailand	Germany	Slovenia
India	Tunisia	Greece	Spain
Indonesia	Vietnam	Hungary	Sweden
		Ireland	United Kingdom
		Italy	Bulgaria
		Latvia	Croatia

NOTES Based on data from the IMF fiscal monitor database (https://www.imf.org/en/Publications/FM). We investigate the effects of GVCs in South-South and South-North trade. Bulgaria and Croatia are classified as emerging market economies based on the IMF fiscal monitor database. Hence, we follow this classification and put them in countries that belong to the Global South. For the South-North trade, we use EU countries to capture domestic value added (DVA). Thus, because Bulgaria and Croatia are members of the EU we include them in the advanced economies as well.

Methodological Considerations

We employed the pooled OLS to show the baseline regressions of the analysis. The popularity of this approach in the literature is based on its ability to capture the fluctuations of the data. The model also predicts robust estimates by capturing country-year observations. We then use the system GMM method as a robustness test for our analysis. This estimator is ideal when the period under study is less than the number of observations. It also helps to identify regressors that are not only exogenous (Arellano and Bover 1995). Another advantage of this model is that it solves the problem of dynamic panel bias when the lagged regressor is correlated with the fixed effect of the error term.

Previous studies in the regression literature have indicated that not treating the problem of endogeneity may result in serious bias in the regression results (see Lee 2007; Sakata 2007; Guei and Choga 2022). To

TABLE 2 Summary Statistics

Variable	(1)	(2)	(3)	(4)	(5)
Economic upgrading (south)	242	43622.3	72621.9	241.5	468107.3
GVC (south)	242	40136.5	73217.7	394.8	480416.6
GDP per capita	242	9266.1	9752.1	474.1	47740.5
Innovation	136	0.819	0.384	0.042	2.065
Foreign direct investment (× 1000000)	136	36452	59376	52	290928
Inflation	136	4.748	3.319	−1.418	15.534
Institutional quality	143	30.871	18.719	4.265	74.271
Infrastructure	117	63.222	42.185	3	136
Economic upgrading (north)	242	31209.4	56060.3	27.2	304358.1
GVC (north)	242	28295.1	44761.3	293.3	291185.8

NOTES Column headings are as follows: (1) observations, (2) mean, (3) standard deviation, (4) minimum, (5) maximum.

deal with the problem of the endogeneity issue and country-specific effect, we apply a system GMM model. The endogeneity problem may occur because of an omitted independent factor that can affect economic upgrading. It can also occur if both economic upgrading and the independent variables influence each other.

The system GMM provides several benefits. The first advantage is that it allows for the inclusion of several instruments which can in turn enhance efficiency in the model. Secondly, the system GMM does not remove the fixed effects as in the difference GMM and can allow for an unknown form of heteroscedasticity and does not require normal distributions assumptions (Greene 2002). To examine the link between GVC participation and exports upgrading we first investigate their relationship in South-South trade. We then include other country-specific characteristics. We follow the same approach for the South-North trade.

This section has three steps. The first sub-section presents the results from South-South trade. The second sub-section discusses the findings from the South-North trade, while the third sub-section carries the robustness analysis.

GVC PARTICIPATION AND ECONOMIC UPGRADING: SOUTH-SOUTH TRADE

We start by discussing the results of the South-South trade which is reported in table 3. Column (1) up to column (4) show the pooled OLS re-

TABLE 3 Impact of South-South Trade (GVC Participation and Economic Upgrading)

Item	Pooled OLS estimates			
	(1)	(2)	(3)	(4)
GVC participation	1.099***	1.426***	1.478***	1.559***
	(0.027)	(0.035)	(0.044)	(0.050)
GDP per capita	–	0.361***	0.298***	0.346***
		(0.045)	(0.056)	(0.061)
Innovation	–	−0.598***	−0.660***	−0.624***
		(0.110)	(0.114)	(0.126)
FDI	–	−0.142***	−0.162***	−0.221***
		(0.037)	(0.011)	(0.039)
Inflation	–	−0.021**	−0.016	−0.022*
		(0.011)	(0.011)	(0.012)
Institutional quality	–	–	0.154**	0.276***
			(0.083)	(0.087)
Infrastructure	–	–	–	0.099**
				(0.054)
Observations	242	136	136	117
R-squared	0.86	0.97	0.97	0.97

NOTES * Denotes significant at 10% level; ** significant at 5% level; *** significant at 1% level.

sults. Specifically, column (1) displays the results when we regress economic upgrading on the participation of GVCS without controlling for other regressors. The results reveal a positive and significant association between the participation of GVCS and economic upgrading. The magnitude of the effect increases as we control for other important determinants of economic upgrading. Specifically, column (1) and column (4) show that a 1% increase in GVC leads to 1.09% and 1.5% rise in economic upgrading, respectively.

These results are consistent with the findings of Criscuolo and Timmis (2017), and Ndubuisi and Solomon (2020). For instance, Ndubuisi and Solomon (2020) show that the participation of GVC has a positive effect on the quality level of exports using both a panel fixed effect and an IV regression method. This result remains the same regardless of the specification of the controlled variables.

In column (2), we include other independent variables as indicated in equation (1) except for Institutional quality and Infrastructure. In column (3) and (4), we include Institutional quality and Infrastructure, respec-

tively. The coefficient on our main variable (GVCS) remains unchanged in all our specifications. The coefficient remains positive and significant, with the effects being stronger when we control for Institutional quality and Infrastructure.

We control for macroeconomic stability using the inflation variable. The results show that macroeconomic stability has a negative effect on economic upgrading in columns (2) and (3). A possible explanation can be attributed to the distortionary impact inflation volatility has on export upgrading. The foreign direct investment coefficient is negative and significant in all our specifications, indicating an inefficient allocation of resources and the inability of investment to enhance economic upgrading. The innovation coefficient is also negative, suggesting that innovation in South-South trade does not promote export upgrading.

Moving on to the level of economic development, the analysis confirms that there is a positive and significant link between GDP per capita and economic upgrading. This finding is consistent with the empirical literature (see Tadesse and Shukralla 2013; Agosin, Alvarez, and Bravo-Ortega 2012).

GVC PARTICIPATION AND ECONOMIC UPGRADING: SOUTH-NORTH TRADE

Next, in table 4, we perform an additional analysis but this time we examine the impact of South-North flow on economic upgrading. The findings regarding our main variable are similar to table 3. Thus, GVCS participation has a positive and significant effect on economic upgrading in all the columns in the table. However, this effect becomes weaker when we control for other regressors. Our results are similar to the broader literature on GVCS that stresses that the participation of GVC can provide access to new knowledge and technology, which in turn improves export upgrading (Harding and Javorcik 2012).

Hausmann, Hwang, and Rodrik (2007) also note that developing economies that export unsophisticated goods can avoid the trap of the Hecksher-Ohlin model through growth in the exports of high technology goods in the context of South-North value chains.

Another interesting finding is that the quality of institution, which is proxied by rule of law, is negative and significant in columns (3) and (4). This suggests that developing countries with poor institutions cannot effectively enhance economic upgrading. The coefficient on inflation and innovation does not have a significant value, which is an indication of

TABLE 4 Impact of South-North Trade (GVC Participation and Economic Upgrading)

Item	Pooled OLS estimates			
	(1)	(2)	(3)	(4)
GVC participation	1.082***	0.952***	0.831***	0.813***
	(0.025)	(0.030)	(0.039)	(0.043)
GDP per capita	–	−0.035	0.067*	0.057
		(0.029)	(0.036)	(0.044)
Innovation	–	0.174**	0.356***	0.382***
		(0.077)	(0.084)	(0.099)
FDI	–	0.002	0.016	0.024
		(0.913)	(0.019)	(0.021)
Inflation	–	0.007	0.003	0.004
		(0.007)	(0.006)	(0.008)
Institutional quality	–	–	−0.241***	−0.197***
			(0.055)	(0.059)
Infrastructure	–	–	–	0.058*
				(0.033)
Observations	242	136	136	117
R-squared	0.87	0.95	0.96	0.96

NOTES * Denotes significant at 10% level; ** significant at 5% level; *** significant at 1% level.

the negligible role these two variables have on exports upgrading. On the other hand, the impact on innovation is positive and significant in the three columns. This is in contrast with the findings in table 3. This finding implies that efforts by developing countries to innovate can help them find a new market in the advanced countries. The impact of FDI is not significant in any of our specifications. This finding is similar to the results of Harding and Javorcik (2012), who show that the effects of FDI on economic upgrading is ambiguous for high income countries. Their study suggests further that there is no evidence that FDI raises economic upgrading (export sophistication) similarly between developing and high-income countries. The impact on GDP per capita is ambiguous, as it is only positive and significant in the third column.

GVC PARTICIPATION AND ECONOMIC UPGRADING: ROBUSTNESS TEST

For the robustness test, the paper first split the period of analysis into two periods by taking the global financial crisis into consideration. Thus, we

TABLE 5 Sensitivity Test (GVC Participation and Economic Upgrading)

Item	Pooled OLS estimates	
	South-south trade	South-north trade
GVC participation	1.560*** (0.050)	0.813*** (0.043)
GDP per capita	0.349*** (0.062)	0.059 (0.045)
Innovation	−0.624*** (0.126)	0.382*** (0.100)
FDI	−0.222*** (0.039)	0.024 (0.021)
Inflation	−0.021* (0.012)	0.004 (0.008)
Institutional quality	0.277*** (0.088)	−0.197*** (0.059)
Infrastructure	0.100** (0.054)	0.059* (0.033)
Observations	117	117
R-squared	0.97	0.96

NOTES * Denotes significant at 10% level; ** significant at 5% level; *** significant at 1% level.

include a dummy variable that assigns the value of 0 to the global financial crisis year and 1 otherwise.

The results from table 5 are similar to our baseline estimations. Column (1) confirms the positive and significant effect of GVC participation on economic upgrading in South-South trade. The effects of institutional quality and infrastructure on economic upgrading have become even stronger. This suggests that these policies variables are important determinants of economic upgrading.

The findings from Column (2) reveal comparable results with our baseline regressions. GVC participation and innovation activities in the context of South-North trade show a consistent and positive impact on economic upgrading.

Thus far, our estimations reveal a positive relationship between GVCS participation and export upgrading regardless of the trade flow considered. While the initial analysis was based on the implicit assumption that the regressors are strictly exogenous in the model, this section assumes the opposite and investigates the effects of GVCS on economic upgrading as highlighted in Brock and Durlauf (2001). Hence, we attempt to correct for omitted specific effects which may be correlated with other independent variables.

We ensure that the Arellano estimator is consistent for the validity of the instruments.

Equation (2) becomes:

$$\begin{aligned}\ln \text{DVA}_{i,t} = {} & \beta_0 + \beta_1 \ln \text{DVA}_{i,t-1} + \beta_2 \ln \text{GVC}_{i,t} + \beta_3 \ln \text{GDP}_{i,t} \\ & + \beta_4 \text{innovation}_{i,t} + \beta_5 \ln \text{FDI}_{i,t} + \beta_6 \text{inflation}_{i,t} \\ & + \beta_7 \ln \text{institutional quality}_{i,t} \\ & + \beta_8 \ln \text{infrastructure}_{i,t} + \varepsilon_t. \end{aligned} \tag{3}$$

The instrument variables also deal with the possibility that the error term may be correlated with the lag of the economic upgrading.

Under this new assumption the new error term $(\varepsilon_t - \varepsilon_{t-1})$ is not serially correlated. Equation (4) controls for country-specific effect:

$$\begin{aligned}\ln \text{DVA}_{i,t} - \ln \text{DVA}_{i,t-1} = {} & \beta_0 + \beta_1(\ln \text{DVA}_{i,t-1} - \ln \text{DVA}_{i,t-2}) \\ & + \beta_2(\ln \text{GVC}_{i,t} - \ln \text{GVC}_{i,t-1}) + \beta_3(\ln \text{GDP}_{i,t} - \ln \text{GDP}_{i,t-1}) \\ & + \beta_4(\text{innovation}_{i,t} - \text{innovation}_{i,t-1}) \\ & + \beta_5(\ln \text{FDI}_{i,t} - \ln \text{FDI}_{i,t-1}) + \beta_6(\text{inflation}_{i,t} \\ & - \text{inflation}_{i,t-1}) + \beta_7(\ln \text{institutional quality}_{i,t} \\ & - \ln \text{Institutional quality}_{i,t-1}) + \beta_8(\ln \text{infrastructure}_{i,t} \\ & - \ln \text{infrastructure}_{i,t-1}) + (\varepsilon_t - \varepsilon_{t-1}). \end{aligned} \tag{4}$$

First, compared to South-South flow (column 1), GVCS have a greater effect on economic upgrading in the case of South-North flow (column 2), meaning that developing countries tend to gain more by trading with more advanced nations. This supports the idea that backward linkage can stimulate demand in the host country. Thus, the quality of exports increases because leading firms can provide knowledge to local suppliers in developing countries (Taglioni and Winkler 2016).

Second, GDP per capita matters for economic upgrading. The results from column 1 show that a higher level of economic development improves economic upgrading. In column 2, GDP per capita has a negative and significant impact on economic upgrading even though the effect is small.

Conclusion

The law of global comparative advantage has changed with the introduction of GVCS. This is because countries have been successful in cutting down communication and transportation costs and taking opportunities for technological advancement.

The pervasiveness of value chains has a strong impact on international trade, productivity and the environment. Participation of GVCS

TABLE 6 Sensitivity Test – System GMM

Item	South-south trade		South-north trade	
Lag (economic upgrading)	0.706***	(0.053)	0.402***	(0.173)
GVC participation	0.355***	(0.078)	0.558***	(0.168)
GDP per capita	0.118***	(0.036)	−0.085**	(0.038)
Innovation	−0.117	(0.074)	−0.113	(0.108)
FDI	0.013	(0.026)	−0.035	(0.044)
Constant	−1.900***	(0.477)	2.057	(1.449)
Observations	104		104	
Arellano-bond test for AR (1)	0.003		0.033	
Arellano-bond test for AR (2)	0.612		0.097	
Hansen test of overid. restrictions	0.144		0.999	

NOTES * Denotes significant at 10% level; ** significant at 5% level; *** significant at 1% level.

offers developing countries the opportunity to improve exports upgrading through the use of foreign intermediate inputs. Understanding the creation of value added by GVCS is crucial for the prosperity of developing countries.

Hence, the paper studies the impact of GVCS on the economic upgrading in developing countries. We specifically distinguish between two types of trade flow (South-South) and (South-North). First, the results from the South-South trade indicate that: (i) GVCS captured as foreign value added embedded in domestic exports is positively associated with economic upgrading; and (ii) the level of economic development contributes positively to economic upgrading. Second, we examine the role of GVCS in the context of South-North trade. The results confirm that GVCS have a positive relationship with economic upgrading. We find that innovation and infrastructure are key contributors in developing countries' economic upgrading.

The findings are robust when we allow for endogenous variables in the model. However, an interesting finding is that the level of economic development has different effects on economic upgrading. Our sensitivity test shows that it is either a driver or an obstacle of economic upgrading in the case of South-South and South-North, respectively.

These developments set the stage for the following policy implications. Although GVCS have a positive effect on economic upgrading in developing countries, the choice of trading partners matters in assessing its

impact. The economic development level is an important channel for economic upgrading. In the case of South-South trade, higher economic development can support economic upgrading and facilitate the integration of developing countries into the global supply chain. It is therefore important for developing countries to carefully select their trading partners to ensure that they fully reap the benefits from every trade policy. Policies to support a strong middle class can also be a stepping stone towards building higher economic upgrading in developing countries.

Policies that ease the participation of developing countries in the global supply chain need to be supported. Achieving such policies will require better quality of institutions and infrastructure development.

A potential limitation of the study is that it captures the effects of GVCS on economic upgrading at the aggregate level, which may be inflated by the efficiency of firms in a certain area of the production chains. Hence, further study may look at sectoral analysis, especially the effects of sophisticated exports goods on economic upgrading.

References

Agosin, M. R., R. Alvarez, and C. Bravo-Ortega. 2012. 'Determinants of Export Diversification Around the World: 1962–2000.' *The World Economy* 35 (3): 295–315.

Akayleh, F. 2014. 'Impact of Trade Openness on Economic Growth in a Small, Open, and Developing Economy: New Instrumental Variable for Trade Openness.' *International Journal of Sustainable Economy* 6 (2): 142–70.

Amador, J., and S. Cabral. 2015. 'Global Value Chains, Labor Markets, and Productivity.' In *The Age of Global Value Chains,* edited by J. Amador and D. Filippo, 107–20. London: CEPR Press.

Amighini, A., and M. Sanfilippo. 2014. 'Impact of South-South FDI and Trade on the Export Upgrading of African Economies.' *World Development* 64:1–17.

Amiti, M., and C. Freund. 2010. 'An Anatomy of China's Export Growth.' In *China's Growing Role in World trade,* edited by R. Feenstra and S. Wei, 35–56. Chicago: University of Chicago Press.

Arellano, M., and O. Bover. 1995. 'Another Look at the Instrumental Variable Estimation of Error-Components Models.' *Journal of Econometrics* 68 (1): 29–51.

Bernard, A., and J. Jensen. 1995. 'Exporters, Jobs, and Wages in U.S. Manufacturing: 1976–1987.' *Brookings Papers on Economic Activity,* no. 26: 67–119.

Brock, W., and S. Durlauf. 2001. 'Growth Empirics and Reality.' *World Bank Economic Review* 5 (2): 229–72.

Cattaneo, O., G. Gereffi, S. Miroudot, and D. Taglioni. 2013. 'Joining, Upgrading and Being Competitive in Global Value Chains: A Strategic Framework.' Policy Research Working Paper 6406, World Bank, Washington, DC.

Crino, R., and L. Ogliari. 2017. 'Financial Imperfections, Product Quality, and International Trade.' *Journal of International Economics* 104 (C): 63–84.

Criscuolo, C., and J. Timmis. 2017. 'The Relationship between Global Value Chains and Productivity.' *International Productivity Monitor* 32 (Spring): 61–83.

Gereffi, G. 2019. 'Economic Upgrading in Global Value Chains.' In *Handbook on Global Value Chains,* edited by S. Ponte, G. Gereffi, and G. Raj-Reichert, 240–54. Cheltenham, UK: Edward Elgar Publishers.

Görg, H., and E. Strobl. 2001. 'Multinational Companies and Productivity Spillovers: A Metaanalysis.' *Economic Journal* 111 (475): F723–39.

Greenaway, D., and C. Milner. 1990. 'South-South Trade: Theory, Evidence, and Policy.' *The World Bank Research Observer* 5 (1): 47–68.

Greene, W. 2002. *Econometric Analysis.* 5th ed. Upper Saddle River, NJ: Prentice Hall.

Grossman, G. M., and E. Helpman. 1991. *Innovation and Growth in the Global Economy.* Cambridge, MA: MIT Press.

Guei, K., and I. Choga. 2022. 'Assessing the Finance Led Growth Hypothesis: Empirical Evidence from Sub-Saharan Africa.' *African Journal of Science, Technology, Innovation and Development* 14 (1): 114–20.

Harding, T., and S. Javorcik. 2012. 'Foreign Direct Investment and Export Upgrading.' *The Review of Economics and Statistics* 94 (4): 964–80.

Hausmann, R., J. Hwang, and D. Rodrik. 2007. 'What You Export Matters.' *Journal of Economic Growth* 12 (1): 1–25.

Hirschman, A. 1958. *The Strategy of Economic Development.* New Haven, CT: Yale University Press.

Kaplinsky, R., and M. Farooki. 2009. 'Africa's Cooperation with New and Emerging Development Partners: Options for Africa's Development.' Report prepared for the Office of Special Advisor on Africa, Department of Economic and Social Affairs, United Nations, New York.

Kowalski, P., J. Gonzalez, A. Ragoussis, and C. Ugarte. 2015. 'Participation of Developing Countries in Global Value Chains: Implications for Trade and Trade-Related Policies.' OECD Trade Policy Papers 1279, OECD, Paris.

Kummritz, V., D. Taglioni, and D. Winkler. 2017. 'Economic Upgrading through Global Value Chain Participation: Which Policies Increase

the Value Added Gains?' Policy Research Working Paper Series 8007, World Bank, Washington, DC.

Lee, S. 2007. 'Endogeneity in Quantile Regresssion Models: A Control Function Approach.' *Journal of Econometrics* 141 (2): 1131–58.

Lipsey, R., and F. Sjöholm. 2005. 'The Impact of Inward FDI on Host Countries: Why Such Different Answers?' In *Does Foreign Direct Investment Promote Development?* Edited by T. H. Moran, E. Graham, and M. Blomström, 23–43. Washington DC: Peterson Institute for International Economics and Center for Global Development.

Melitz, M. 2003. 'The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity.' *Econometrica* 71 (6): 1695–725.

Mlachila, M., and M. Takebe. 2011. 'FDI from BRICS to LICS: Emerging Growth Driver?' IMF Working Paper 11 (178), IMF, Washington, DC.

Narula, R., and N. Driffield. 2012. 'Does FDI Cause Development? The Ambiguity of the Evidence and Why it Matters.' *European Journal of Development Research* 24 (1): 1–7.

Ndubuisi, G., and O. Solomon. 2020. 'How Important is GVC Participation to Export Upgrading.' MERIT Working Papers 2020-026, United Nations University, Maastricht.

Paus, E., and P. Gallagher. 2008. 'Missing Links: Foreign Investment and Industrial Development in Costa Rica and Mexico.' *Studies of Comparative International Development* 43 (1): 53–80.

Rodrik, D. 2006. 'What's So Special about China's Exports?' *China and the World Economy* 14 (5): 1–19.

———. 2008. 'The Real Exchange Rate and Economic Growth.' *Brookings Papers on Economic Activity,* no. 2: 364–412.

Sakata, S. 2007. 'Instrumental Variable Estimation Based on Conditional Median Restriction.' *Journal of Econometrics* 141 (2): 350–82.

Schiff, M., and Y. Wang. 2006. 'North-South and South-South Trade-Related Technology Diffusion: An Industry-Level Analysis of Direct and Indirect Effects.' *Canadian Journal of Economics* 39 (3): 831–44.

Shepherd, B. 2015. 'Global Value Chains, Technology Transfers and Innovation.' In *Asia-Pacific Trade and Investment Report 2015,* 147–61. Bangkok: United Nations Publications.

Tadesse, B., and E. Shukralla. 2013. 'The Impact of Foreign Direct Investment on Horizontal Export Diversification: Empirical Evidence.' *Applied Economics* 45 (2): 141–59.

Taglioni, D., and D. Winkler. 2016. *Making Global Value Chains Work for Development.* Washington, DC: The World Bank.

UNCTAD. 2015. *Global Value Chains and South-South Trade.* Geneva: UNCTAD.

———. 2019. *World Investment Report 2019: Special Economic Zones*. Geneva: United Nations Conference on Trade and Development.

UNESCAP. 2015. *Asia-Pacific Trade and Investment Report: Supporting Participation in Value Chains.* Bangkok: United Nations.

Wang, J., G. Wan, and C. Wang. 2019. 'Participation in GVCS and CO_2 Emissions.' *Energy Economics* 84:104561. https://doi.org/10.1016/j.eneco.2019.104561.

Xu, J., and Q. Mao. 2018. 'On the Relationship between Intermediate Input Imports and Export Quality in China.' *Economics of Transition and Institutional Change* 26 (3): 429–67.

Zhu, S., and X. Fu. 2013. 'Drivers of Export Upgrading.' *World Development* 51:221–33.

Ali so stroški odpuščanja pomembni za poslovne cikle? Nauki iz Bolgarije (1999–2018)

Aleksandar Vasilev

V uporabljenem modelu so stroški odpuščanja vključeni v realni poslovni cikel, dopolnjen s podrobnim državnim sektorjem. Model je umerjen na bolgarske podatke za obdobje po uvedbi valutnega odbora (1999–2018). Raziskujemo pomen takšnih trenj na trgu dela za ciklična nihanja v Bolgariji. Stroški odpuščanja zmanjšujejo zaposlitveno volatilnost in procikličnost, kjer sta oba učinka v nasprotju s podatki. Drugih pomembnih učinkov stroškov odpuščanja na nihanje poslovnega cikla v Bolgariji nismo našli.

Ključne besede: nihanja poslovnega cikla, trgi dela, stroški odpuščanja, Bolgarija
Klasifikacija JEL: E24, E32
Managing Global Transitions 20 (1): 3–17

Analiza ključnih kazalnikov uspešnosti ponudnikov storitve oskrbe z vodo v Gazi za doseganje 6. cilja trajnostnega razvoja po Združenih narodih

Khalil A. Elnamrouty in Ramez T. Al Madhoun

Članek obravnava vzroke za nestabilnost in nevzdržnost upravljanja s komunalnimi in odpadnimi vodami pri 25 ponudnikih storitev v Gazi v Palestini. Analiza ključnih kazalnikov uspešnosti upravljanja s komunalnimi in odpadnimi vodami v Gazi kaže resne pravne, finančne in operativne pomanjkljivosti, ki vplivajo na prizadevanja za doseganje 6. cilja trajnostnega razvoja, kot so ga opredelili Združeni narodi (SDG 6). Pomanjkljivosti vključujejo neustrezno načrtovanje, pomanjkanje obsežnih programov za krepitev zmogljivosti, zelo visoke ravni izgubljene vode in izkrivljanja v tarifnih strukturah skoraj vseh ponudnikov storitev, kjer je bila povprečna prodajna cena za m3 vode nižja od povprečnega stroška na m^3 prodane vode. Poleg tega je bila raven učinkovitosti zbiranja zelo nizka, kar je ponudnikom storitev povzročilo resne težave z denarnim tokom. Študija je ugotovila pomanjkanje ali odsotnost točnih ali popolnih evidenc o pritožbah, zadovoljstvu in poizvedbah strank; to se jasno odraža v vedenju strank, povezanem z nenaklonjenostjo plačevanju računov in visoko ravnjo nezakonitih povezav.

Ključne besede: 6. cilj trajnostnega razvoja (SDG 6), ključni kazalniki uspešnosti, vodni sektor, ponudniki storitev, občine, Gaza, Palestina
Klasifikacija JEL: Q01, Q25, R25
Managing Global Transitions 20 (1): 19–42

Vpliv pandemije covida-19 na občutke vlagateljev: dokazi iz 12 izbranih velikih s turizmom povezanih podjetij
Helena Nemec Rudež

Da bi razumeli zaupanje vlagateljev in njegovo spremembo v turizmu, eni od panog, ki jih je pandemija najbolj prizadela, so v prispevku predstavljena gibanja cen delnic dvanajstih večjih družb v turistični industriji v prvem letu po izbruhu pandemije covida-19. Opazujemo enomesečni interval zaključnih cen, od 1. januarja 2020, tj. pred razglasitvijo pandemije, do 1. aprila 2021, z namenom ocene zaupanja vlagateljev. Primerjamo zaupanje vlagateljev med podjetji v različnih sektorjih turistične industrije. Sama pandemija med svojim potekom ni imela nedvoumnega vpliva na cene delnic, saj kaže, da so si nekatere opomogle v nekaj mesecih, druge pa ne, in to niti eno leto po izbruhu pandemije. Na podlagi enoletnih gibanj cen delnic po izbruhu smo opredelili tri skupine s turizmom povezanih podjetij.

Ključne besede: pandemija covida-19, s turizmom povezana podjetja, cena delnice, zaupanje vlagatelja
Klasifikacija JEL: D53, L83, D25
Managing Global Transitions 20 (1): 43–58

Globalne vrednostne verige in gospodarska nadgradnja v državah v razvoju
Kore Marc Guei in Ireen Choga

Pojav globalnih vrednostnih verig je državam omogočil specializiranje za proizvodnjo specifičnih vložkov (vmesno blago in končno blago), kar neposredno vpliva na produktivnost. Prispevek raziskuje vpliv globalnih vrednostnih verig na gospodarsko nadgradnjo gospodarstev v razvoju. Konkretno se naša analiza nanaša na učinek tuje dodane vrednosti v bruto izvozu na domačo dodano vrednost bruto izvoza (gospodarska nadgradnja), ki vključuje dodano vrednost, ki izhaja iz vseh industrij države izvoznice, za njihove trgovinske partnerje. Vzorec zajema 50 držav (22 držav v razvoju in 28 razvitih držav) v obdobju 2005–2015. Uporabimo tako združeno metodo najmanjših kvadratov (pooled OLS) kot tudi generalizirano metodo trenutkov (GMM). K literaturi prispevamo z razlikovanjem med trgovinskimi tokovi iz gospodarstev v razvoju (jug–jug) in razvitih gospodarstev (jug–sever). Rezultati kažejo

na pozitivno povezavo med sodelovanjem globalnih vrednostnih verig in gospodarsko nadgradnjo, pri čemer je učinek močnejši v primeru povezovanja jug–sever. Nadalje, rezultati podpirajo stališče, da ima lahko razvoj infrastrukture ključno vlogo pri podpiranju gospodarskega razvoja gospodarstev v razvoju. BDP na prebivalca, inovacije in institucionalna kakovost lahko spodbujajo gospodarsko nadgradnjo, čeravno se njihovi učinki razlikujejo glede na trgovinske tokove.

Ključne besede: izvoz, nadgradnja, globalne vrednostne verige
Klasifikacija JEL: F00, F10, F13
Managing Global Transitions 20 (1): 59–78